

Bang&Olufsen

Beovision LX 5000/6000

Type 42xx

Beovision MX 4000/6000

Type 35xx

Beocord BE1100

Nicam
Picture-in-Picture
Transposer

Stands LX

TB 4108
ST 4117
MS 4106
MB 4101

Stands MX

TB 4110
ST 4109
MS 4107
MS 4116
MB 4102
MB 4105
WB 4114



SERVICEANVISNING
SERVICE MANUAL



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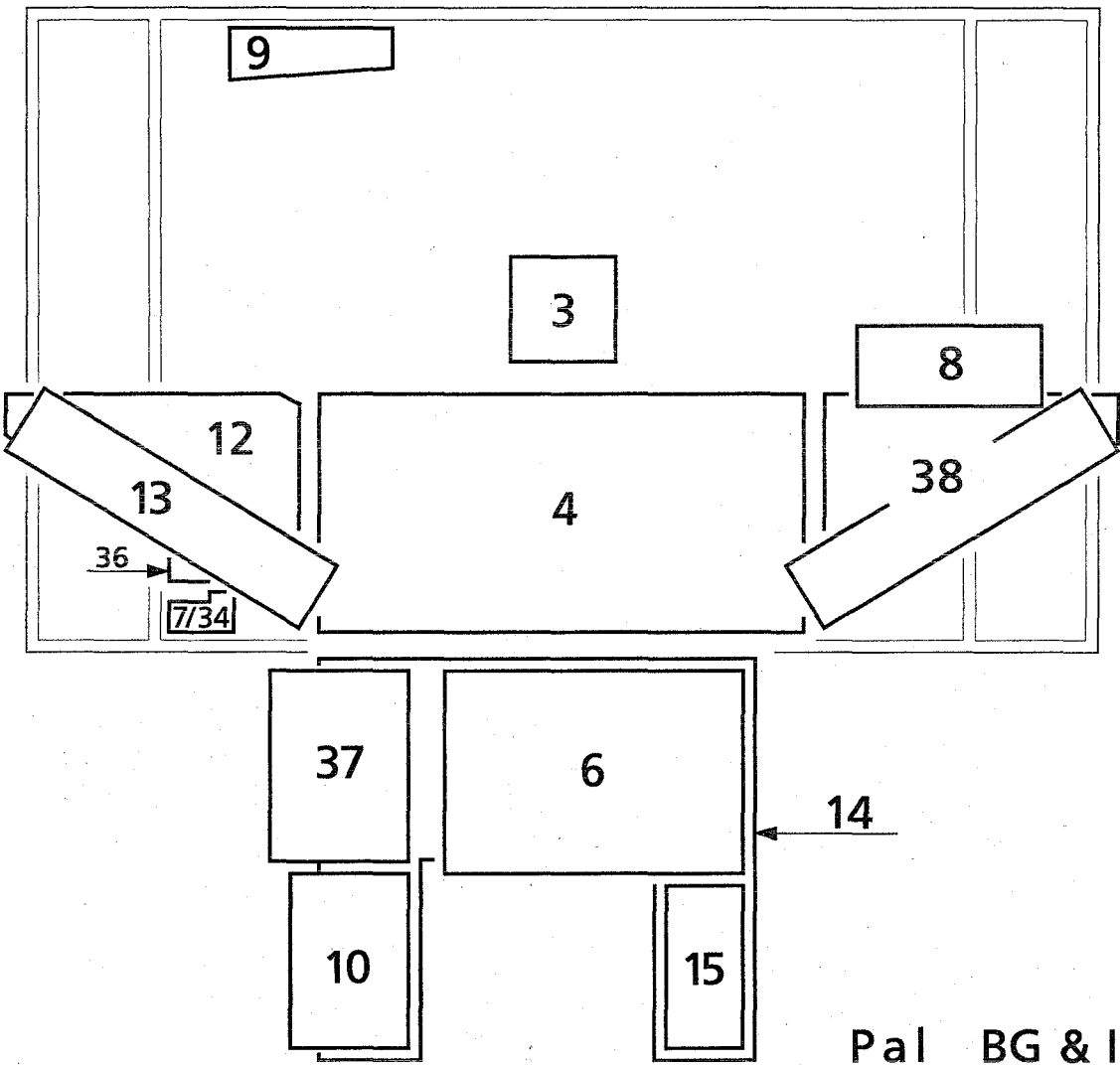
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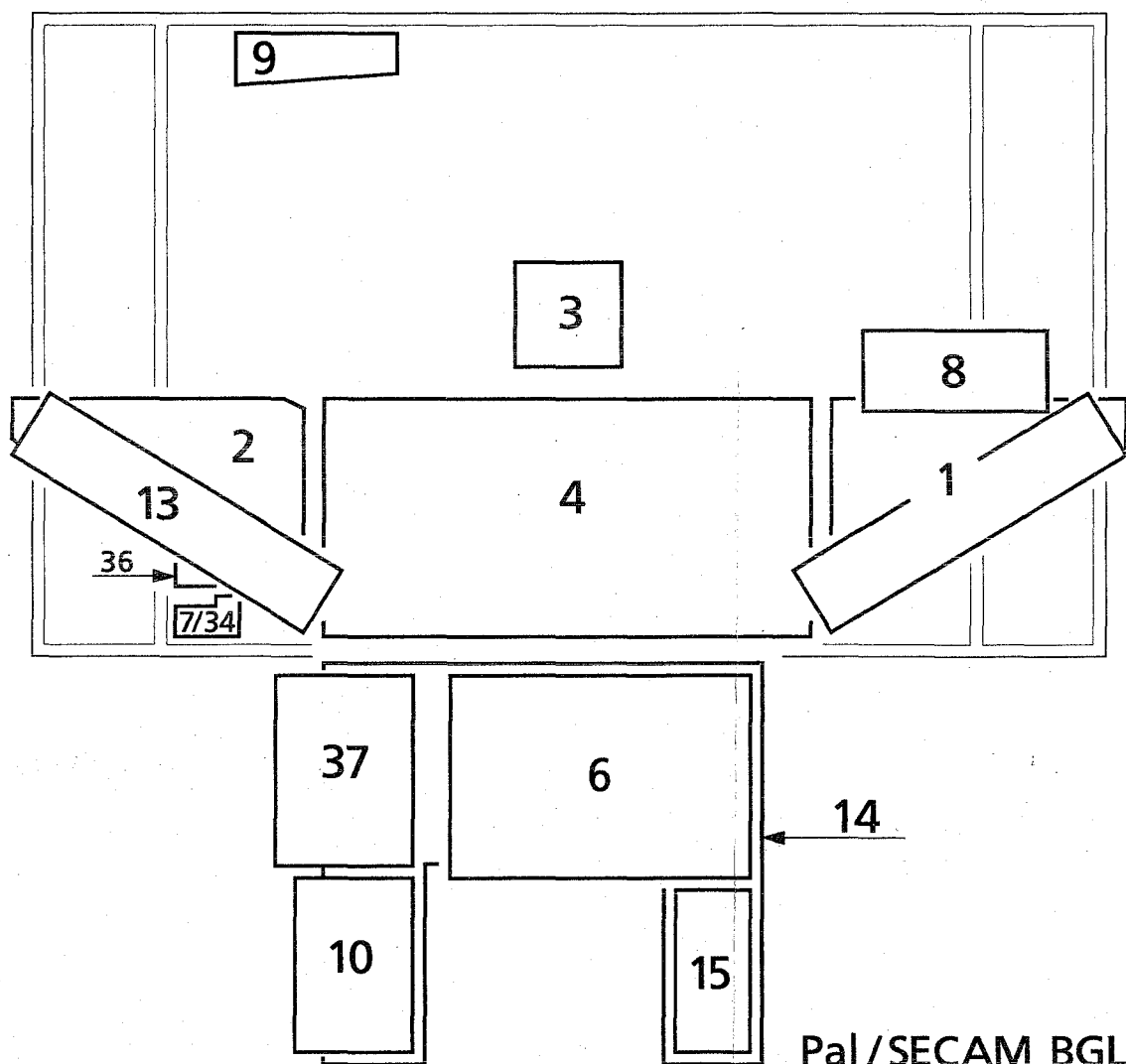
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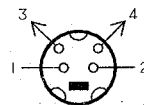
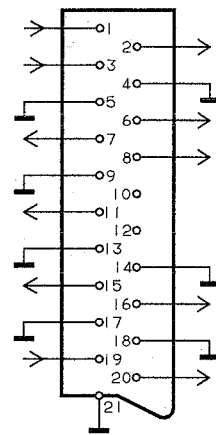


1-2

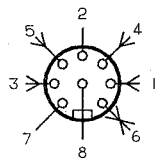
TECHNICAL SPECIFICATIONS	Beovision MX4000-MX6000-LX5000-LX6000
CTV system	*
Picture tube (Visual picture)	LX5000 63 cm – 25" (59 cm – 23") LX6000 70 cm – 28" (66 cm – 26") MX4000 55 cm – 21" (51 cm – 20") MX6000 70 cm – 28" (66 cm – 26")
Picture tube system	Flat square, Hi-Bri, In-Line 110 degrees
Cabinets	LX: Rosewood – White – Grey Metallic MX: Red – White – Black – Blue – Grey
Operation	Beolink 1000, one-way Beolink 5000, two-way Beolink 7000, two-way
TV tuner range	46-855 MHz: VHF, S, Hyper, UHF channels *(System I 470-855 MHz: UHF channels)
No. of TV programmes	59 (+5 for local rooms)
Station identification	Station naming/program list
Satellite	*Prepared for Beosat LM
No. of satellite programmes	99
Signal/noise level	>35 dB/1Vpp and antenna signal >1 mV
Crosstalk between sources	>45 dB/5 MHz
Teletext	FLOF, 6-alphabet
Teletext memory	4 x 59 page nos.
Sound system	*Nicam + A2 stereo decoder + A2 dual language
Speaker system	2 x Bass reflex, (MX 4000 2 x Log Line)
Long-term max. output power	2 x 40 watts/8 ohms
Harmonic distortion	<0.5% at 15 watts
Intermodulation	<1%
Signal/noise ratio	>50 dB weighted 50 mW (Nicam >70 dB)
Frequency range	25-20,000 Hz \pm 1.5 dB
Power bandwidth	25-20,000 Hz
Channel separation	A2 stereo >26 (Nicam >50 dB)
Bass control	\pm 8 dB/100 Hz
Treble control	\pm 8 dB/10,000 Hz
Crossover frequency	2500 Hz
Other data	
Mains voltage	220V-240 volts, 50-60 Hz
Power consumption	100 (75-165) watts
Power consumption Stand-by	3 watts
Dimensions W x H x D/Weight	LX5000 78 x 47 x 42 cm/36.5 kg LX6000 86 x 52 x 46 cm/43 kg MX4000 51 x 55 x 41.5 cm/23 kg MX6000 65 x 67.5 x 46.5 cm/40.3 kg

1-2

AV1 & AV2			Pin 1	Audio R out 1V RMS 820 ohms
			Pin 2	Audio R in 1V RMS 47 kohms
			Pin 3	Audio L out 1V RMS 820 ohms
			Pin 4	Audio ⊥
			Pin 5	Blue ⊥
			Pin 6	Audio L in 1V RMS 47 kohms
			Pin 7	Blue in 0.7Vpp 75 ohms
			Pin 8	12V sense Logic 0 = 0V-2V 10 kohms Logic 1 = 9.5V-12V 10 kohms Data High: Logic 0 = 9.5V-10.3V Logic 1 = 11V-12V Low: Logic 0 = 0V-0.55V Logic 1 = 1.25V-2V
			Pin 9	Green ⊥
			Pin 10	Not used
			Pin 11	Green in 0.7 Vpp 75 ohms
			Pin 12	Not used
			Pin 13	Red ⊥
			Pin 14	Blanking ⊥
			Pin 15	Red in 0.7 Vpp 75 ohms
			Pin 16	Blanking in Logic 0=0 to 0.4V Logic 1=1 to 3V R in 75 ohms
			Pin 17	Video out ⊥
			Pin 18	Video in ⊥
			Pin 19	Composite video out 1Vpp 75 ohms (Y-insert only AV1)
			Pin 20	Composite video in 1Vpp 75 ohms
			Pin 21	Shield
S-VHS			Pin 1	Y ⊥
			Pin 2	C ⊥
			Pin 3	Luminance in (Y) 1Vpp 75 ohms
			Pin 4	Chrominance in (C) 75 ohms



POWER LINK 1&2



Pin 1 PL ON = >2.5V, OFF = <0.5V

Pin 2 Signal \perp

Pin 3 AF out left max. 1V RMS

Pin 4 PL Speaker ON = >2.5 V, OFF = <0.5V

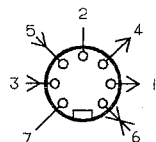
Pin 5 AF out right max. 1V RMS

Pin 6 Data: High >3.5V, Low <0.8V

Pin 7 \perp

Pin 8 Not used

AUDIO AUX LINK



Pin 1 AF in left 0.25 - 2V RMS 47 kohms

Pin 2 Signal \perp

Pin 3 AF out left 1V RMS 1 kohms

Pin 4 AF in right 0.25-2V RMS 47 kohms

Pin 5 AF out right 1V RMS 1 kohms

Pin 6 Data: High >3.5V, Low <0.8V

Pin 7 Not used

EXTERNAL SPEAKERS L&R

>8 ohms passive speakers

HEADPHONE



ø3.5 mm 220 ohms in series

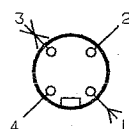
to the output amplifier.

The internal and external

speakers are switched off

when the headphone is connected.

B&O STAND



Pin 1 Supply out 12.5V-15V max. 350 mA

Pin 2 Supply \perp

Pin 3 Data

Pin 4 Data \perp

Accessories

Nicam module	8930480 system B/G
	8930490 system I
Beosat LM installation kit	1300200 (with sw version 3.0 or higher)
Positioner module	1301200
Power positioner module	8729020
NTSC system M module	*8007997
Picture-in-picture module	1412200 (LX models)
	1412300 (MX models)
Transposer	*1306125 white
	*1306126 black
Sound extension kit:	
Pal I sound kit for B/G/L	*3390452
East D/K sound kit for B/G/L	*3390453

Stands LX5000 – LX6000

Table: TB 4108	1410865, white
	1410866, black
Traverse: LX6000 – TR 4103	1410365, white
	1410366, black
LX5000 – TR 4104	1410465, white
	1410466, black
Shelf: LX6000 – SH 4111	1411113, metal grey
LX5000 – SH 4112	1411213, metal grey
Stand: ST 4117	1411766, black
	1411769, silver grey
Shelf: SH 4113	1411366, black
Motorized stand: MS 4106	1410666, black
	1410669, silver grey
Shelf: SH 4113	1411366, black
Motorized base: MB 4101	1410111, aluminium

Stands MX4000 – MX6000

Table MX4000 – TB 4110	1411066, black
	1411069, silver grey
Shelf: VX – SH 4113	1411366, black
Stand MX6000 – ST 4109	1410966, black
	1410969, silver grey
Shelf: VX – SH 4113	1411366, black
Motorized stand MX6000 – MS 4107	1410766, black
	1410769, silver grey
MX4000 – MS 4116	1411666, black
	1411669, silver grey
Shelf: VX – SH 4113	1411366, black
Motorized base MX6000 – MB 4102	1410211, aluminium
MX4000 – MB 4105	1410511, aluminium
Wall bracket MX4000 – WB 4114	1411466, black

*TYPE SURVEY								Mounting modules for modification to other TV transmission systems						
								PAL B/G/I	PAL/SECAM B/G/L/I ¹⁾	PAL/SECAM B/G/D/K	PAL B/G	PAL/SECAM B/G	PAL/SECAM B/G/L ¹⁾	PAL/SECAM B/G NTSC M
LX6000	LX5000	MX6000	MX4000	System	Colour	Remarks								
4200	4220	3500	3520	B/G/L ¹⁾	PAL/SECAM	A2	EU		3390452	3390453				8007997
4201	4221	3501	3521	B/G/L ¹⁾	PAL/SECAM	A2+NICAM ²⁾	EU		3390452	3390453				8007997
4202	4222	3502	3522	I	PAL		GB	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629	8007769	8007769 +8007629	8007449 +8007629	8007997 +8007629
4203	4223	3503	3523	I	PAL	NICAM ²⁾	GB	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629	8007769	8007769 +8007629	8007449 +8007629	8007997 +8007629
4204	4224	3504	3524	B/G/L ¹⁾	PAL/SECAM	A2	Italy		3390452	3390453				8007997
4205	4225	3505	3525	B/G	PAL	A2	AUS	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629		8007629	8007449 +8007629	8007997 +8007629
4206	4226	3506	3526	B/G	PAL	A2	EU	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629		8007629	8007449 +8007629	8007997 +8007629
4207	4227	3507	3527	B/G	PAL	A2+NICAM ²⁾	EU	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629		8007629	8007449 +8007629	8007997 +8007629
4240	4270	3540	3570	B/G/L ¹⁾	PAL/SECAM	A2	EU		3390452	3390453				8007997
4243	4273	3543	3573	B/G/L ¹⁾	PAL/SECAM	A2+NICAM ²⁾	EU		3390452	3390453				8007997
4245	4275	3545	3575	B/G/L ¹⁾	PAL/SECAM	A2+NICAM ²⁾	EU		3390452	3390453				8007997
4246	4276	3546	3576	I	PAL		GB	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629	8007769	8007769 +8007629	8007449 +8007629	8007997 +8007629
4249	4279	3549	3579	I	PAL	NICAM ²⁾	GB	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629	8007769	8007769 +8007629	8007449 +8007629	8007997 +8007629
4252	4282	3552	3582	B/G/L ¹⁾	PAL/SECAM	A2	Italy		3390452	3390453				8007997
4257	4287	3557	3587	B/G	PAL	A2	EU	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629		8007629	8007449 +8007629	8007997 +8007629
4258	4288	3558	3588	B/G	PAL	A2+NICAM ²⁾	EU	3390452 +8007449	3390452 +8007449 +8007629	3390453 +8007449 +8007629		8007629	8007449 +8007629	8007997 +8007629

¹⁾System L: To receive VHF band 1 system L, the TV has to be fitted with a transposer part no. 1306125 (white) 1306126 (black).

²⁾It is not possible to receive NICAM system B/G and NICAM system I with the same type.
NICAM PCB: NICAM system B/G no. 8930480. NICAM system I no. 8930490.

8007449 Tuner & IF system B/G/L PCB.
3390452 Small bag with components to extend 8007449 to system I.
3390453 Small bag with components to modify 8007449 to system B/G/D/K.
8007629 PAL/SECAM/NTSC colour decoder PCB. TV's equiped with 8007629 (PAL/SECAM MODELS) are able to receive NTSC on AV.
8007997 Tuner & IF system B/G/M PCB.
8007769 Tuner & IF system B/G PCB.

DIAGRAMFORKLARING

På diagrammerne er der angivet typenumre på transistorer og IC'er. Hvis positionsnummeret er efterfulgt af en stjerne, skal reservedelsnummeret altid benyttes, da denne komponent er specielt udvalgt, f.eks. TR102*.

Komponenttryk og koordinatsystem

De største printplader er forsynet med komponenttryk og et koordinatsystem på både print- og komponentside. På diagrammerne er enhver komponent forsynet med et koordinatnummer. Dette fortæller i hvilket koordinat på printpladen, komponenten er placeret. Koordinatnumrene er angivet med mindre skrifttype end positionsnumrene.

Styrekredsløb

I visse styrekredsløb er den aktive tilstand angivet med en funktions- eller bogstavsangivelse. Denne kan eksempelvis være ST.BY. = »low« i stand-by-stilling eller ST.BY. = »high« i stand-by-stilling.

Ledningsforbindelser

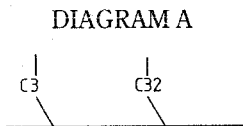
Ledningsforbindelserne på diagrammerne er samlet i »bundter«. De enkelte ledninger er forsynet med en af følgende koder:

INTERN FORBINDELSE PÅ EN DIAGRAMSIDE



Interne forbindelser på en diagramside angives med et tal. Knækket på ledningen viser, i hvilken retning, den anden ende af ledningen findes.

FORBINDELSE TIL EN ANDEN DIAGRAMSIDE



Forbindelsen til en anden diagramside angives med et tal samt et bogstav for det diagram, forbindelsen går til.

EXPLANATION OF DIAGRAM

Type numbers of transistors and ICs are indicated on the diagrams. If the position number is followed by an asterisk the spare part number must always be used because the component in question has been specially selected, e.g. TR102*.

Component print and coordinate system

The largest PCBs have component prints and a coordinate system on both the print and the component side. On the diagrams every component has a coordinate number. This indicates in which coordinate on the PCB the component is situated. The coordinate numbers are written in smaller print types than the position numbers.

Control Circuit

In certain control circuits the active mode is indicated by a function term or by an abbreviation. This may be e.g. ST.BY. = low in the stand-by mode or ST.BY. = high in the stand-by mode.

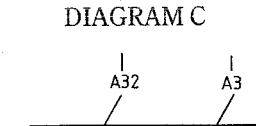
Wiring Connections

The wiring connections on the diagrams are assembled in 'bundles'. The individual wires are provided with one of the following codes:

INTERNAL CONNECTION ON ONE DIAGRAM PAGE

Internal connections on a diagram page are indicated by a number. The bend of the wire indicates in which direction the other end of the wire is found.

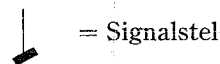
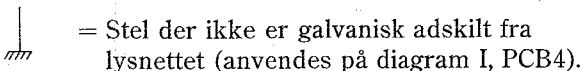
CONNECTION TO ANOTHER DIAGRAM PAGE



A connection to another diagram page is indicated by a number as well as by a letter of the diagram to which the connection leads.

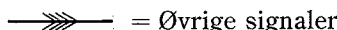
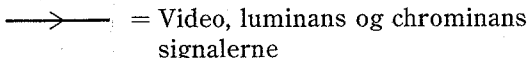
Stelsymboler

Der anvendes tre forskellige stelsymboler i diagrammerne som vist:



Signalveje og markering på IC'erne

Signalvejene er vist på diagrammerne ved hjælp af kraftigere optrukne streger og pile. Der anvendes tre forskellige typer pile som vist:



Pilene der er vist på benene af IC'erne, fortæller om det pågældende ben er en ind- eller udgang.

MÅLEBETINGELSER

Alle DC spændinger er målt i forhold til stel og med voltmeter eller oscilloskop med en indre modstand på mindst 2 Mohm.

DC spændinger og oscilloskopbilleder er målt i TV mode ved et UHF antennesignal (farvebar) på ca. 1,5 mV. Lys step 32, kontrast step 44 og farvemætning step 32.

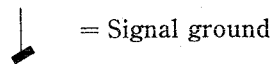
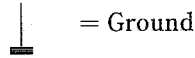
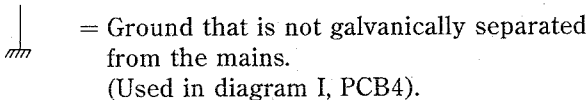
SYMBOL FOR SIKKERHEDSMODSTANDE



Ved udskiftning af komponenter med dette symbol skal der anvendes samme type, samt samme værdier for ohm og watt. Den nye komponent skal monteres på samme måde som den udskiftede.

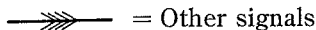
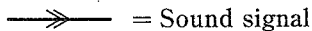
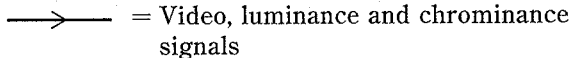
Ground symbols

Three different ground symbols are used in the diagrams:



Signal paths and IC markings

The signal paths are shown in the diagrams by means of semibold lines and arrow heads. As shown, three different types of arrow head are used:



The arrow heads shown in the IC pins tell whether the pin indicated is an input or an output.

MEASURING CONDITIONS

Measure all DC voltages in relation to ground and with voltmeter or oscilloscope with inner resistance of at least 2 Mohm.

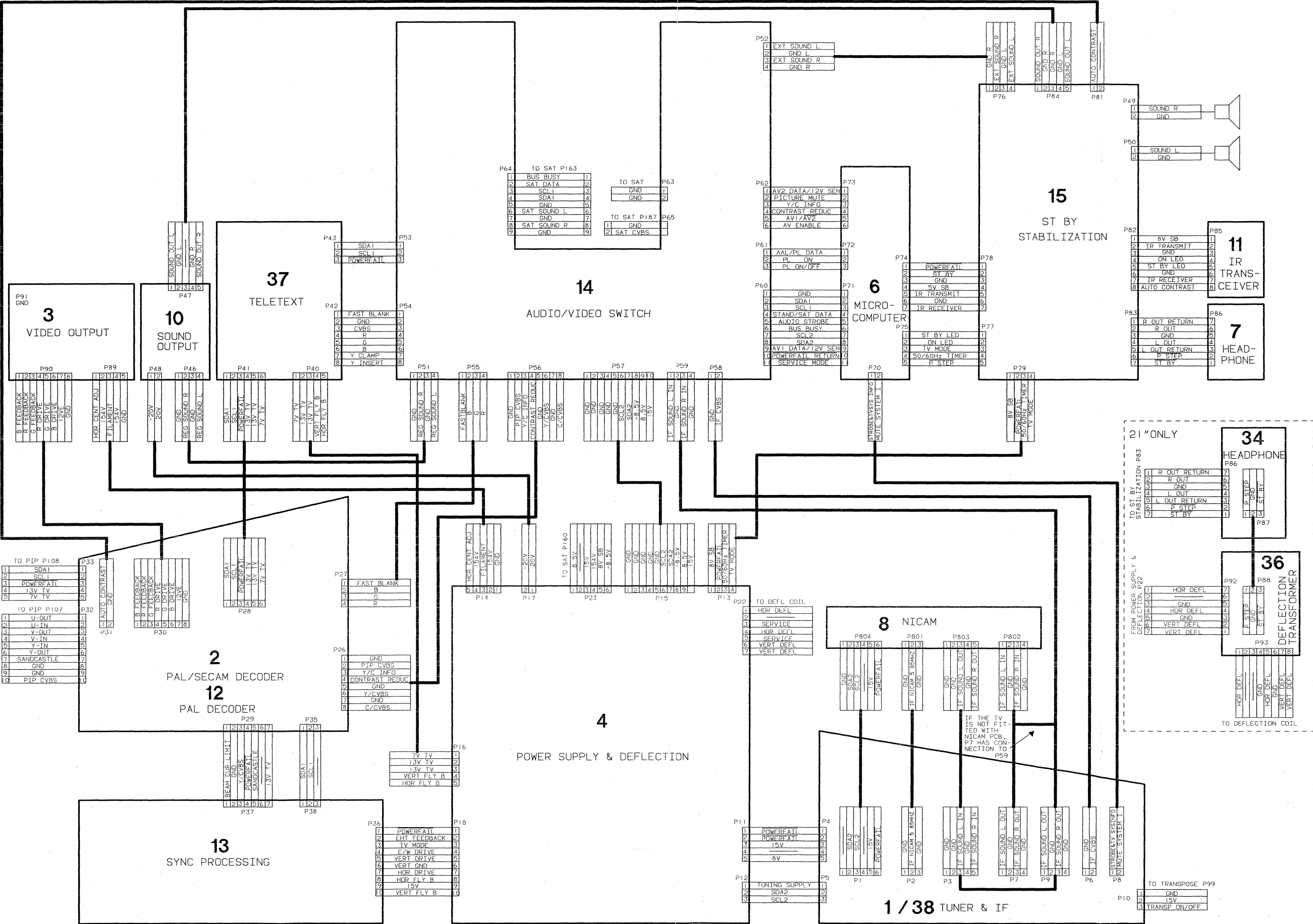
Measure DC voltages and oscilloscope pictures in TV mode at an UHF aerial signal (colour bar) of approx. 1.5 mV. Brilliance step 32, contrast step 44 and colour saturation step 32.

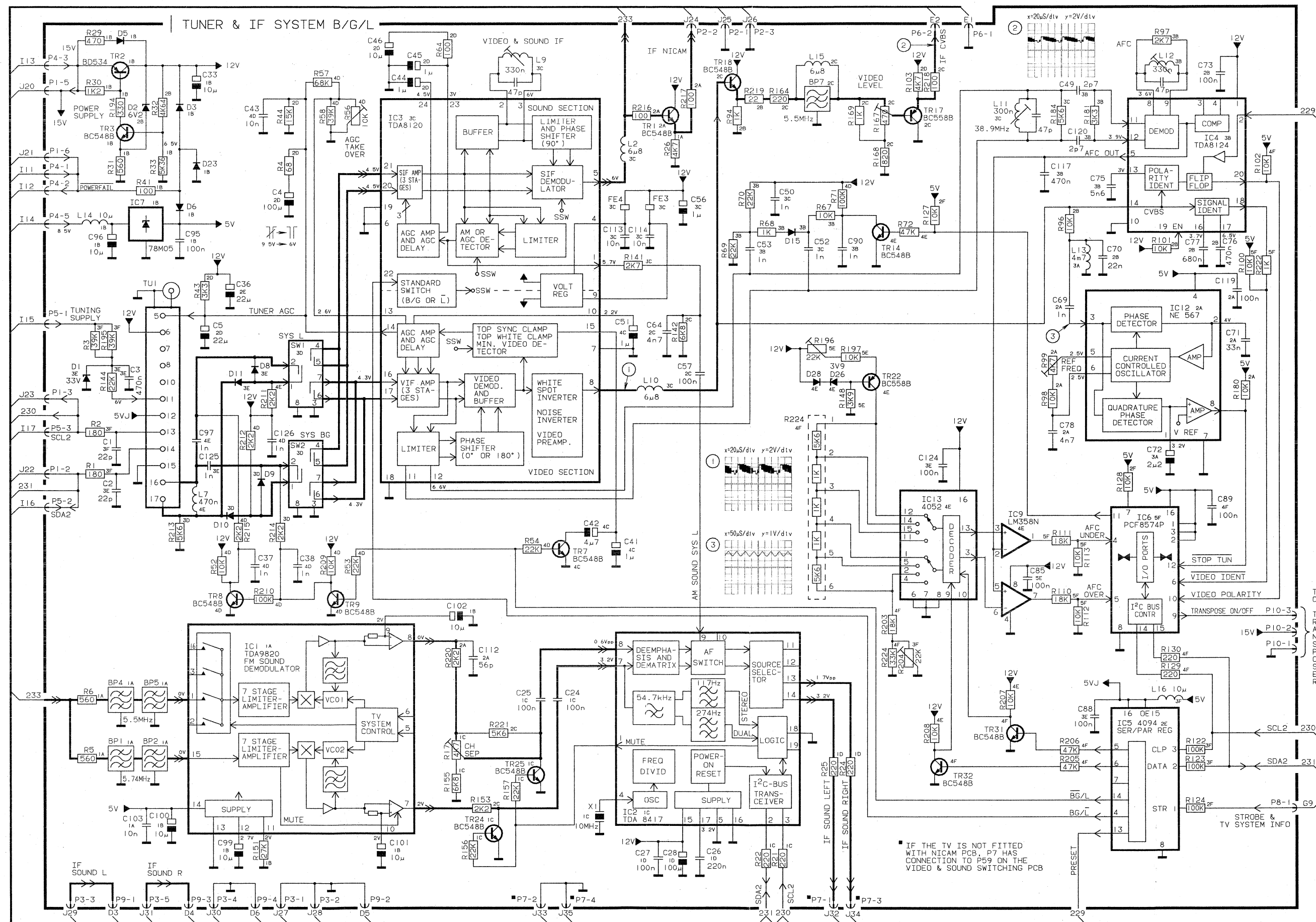
SYMBOL FOR SAFETY RESISTORS

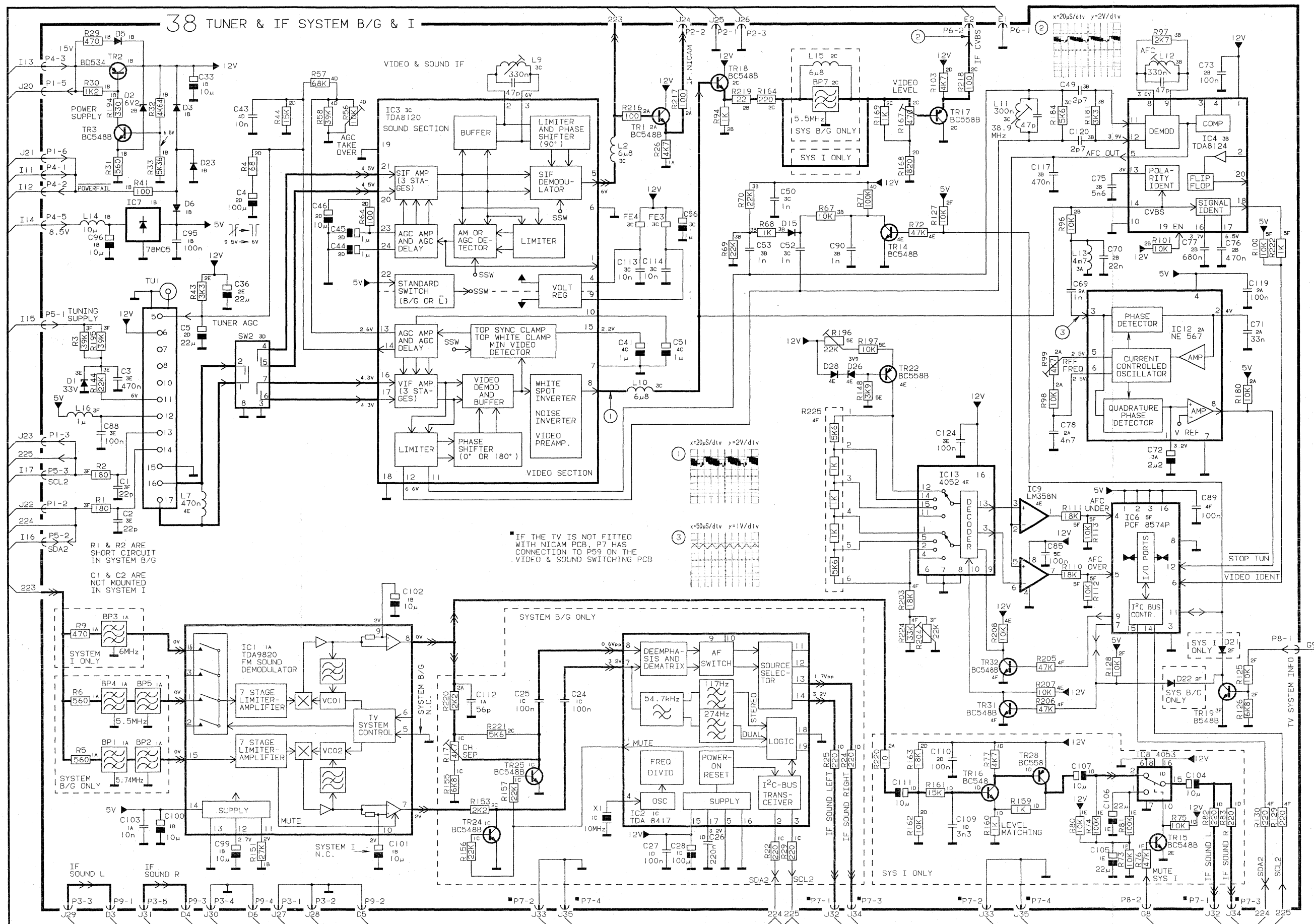


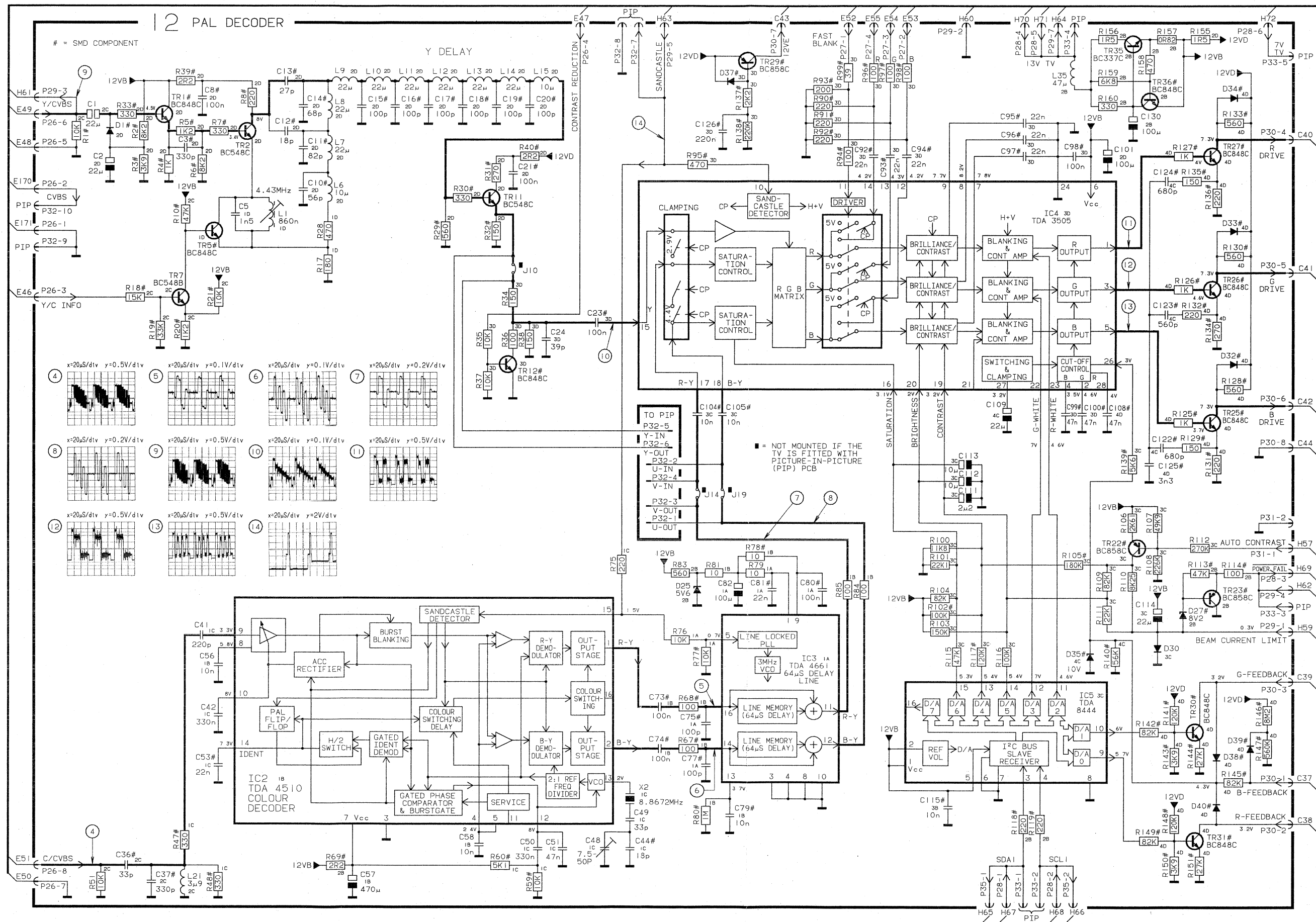
When replacing components with this symbol the same type has to be used, also the same values for ohm and watt. The new component is to be mounted in the same way as the replaced one.

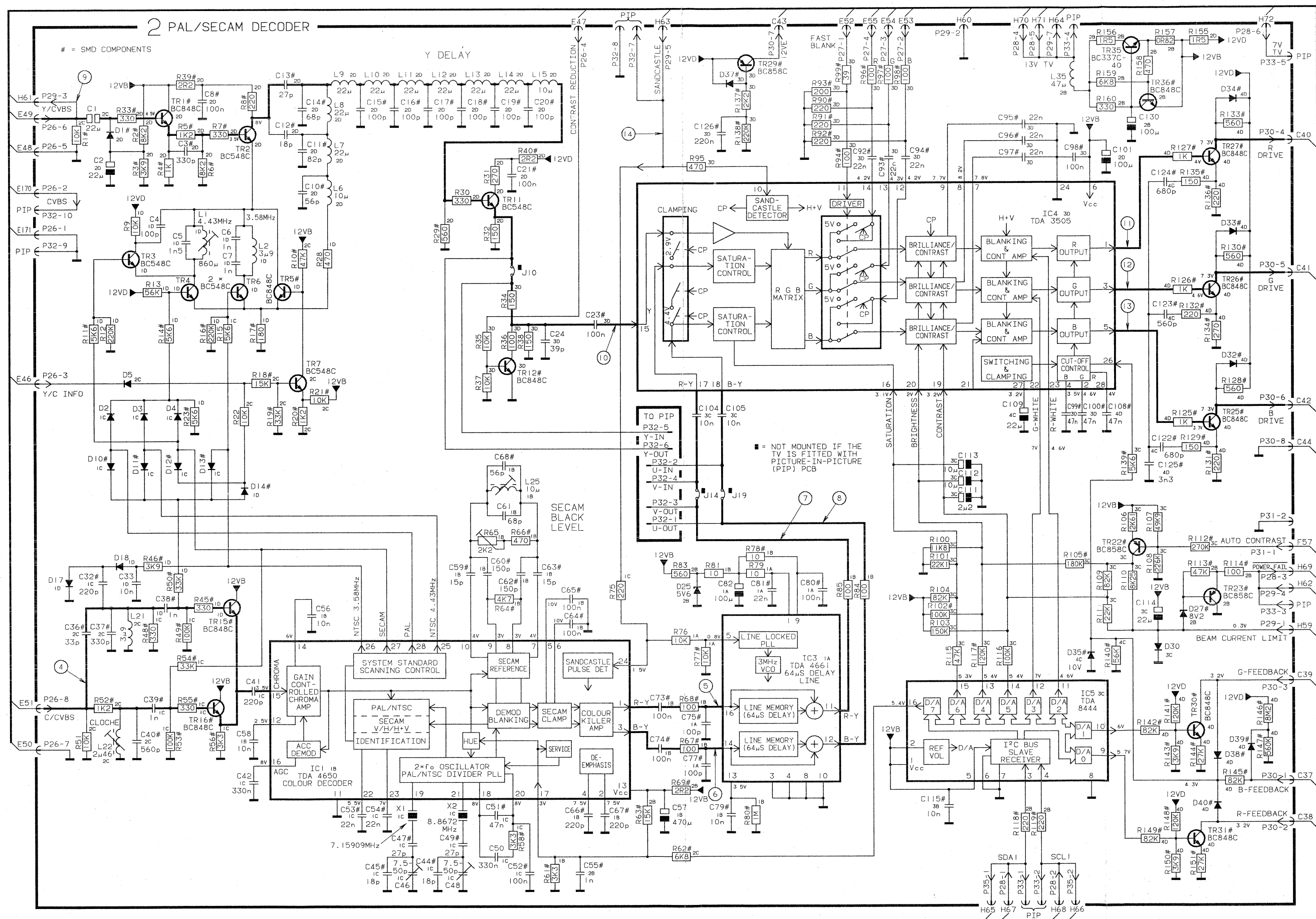
WIRING DIAGRAM

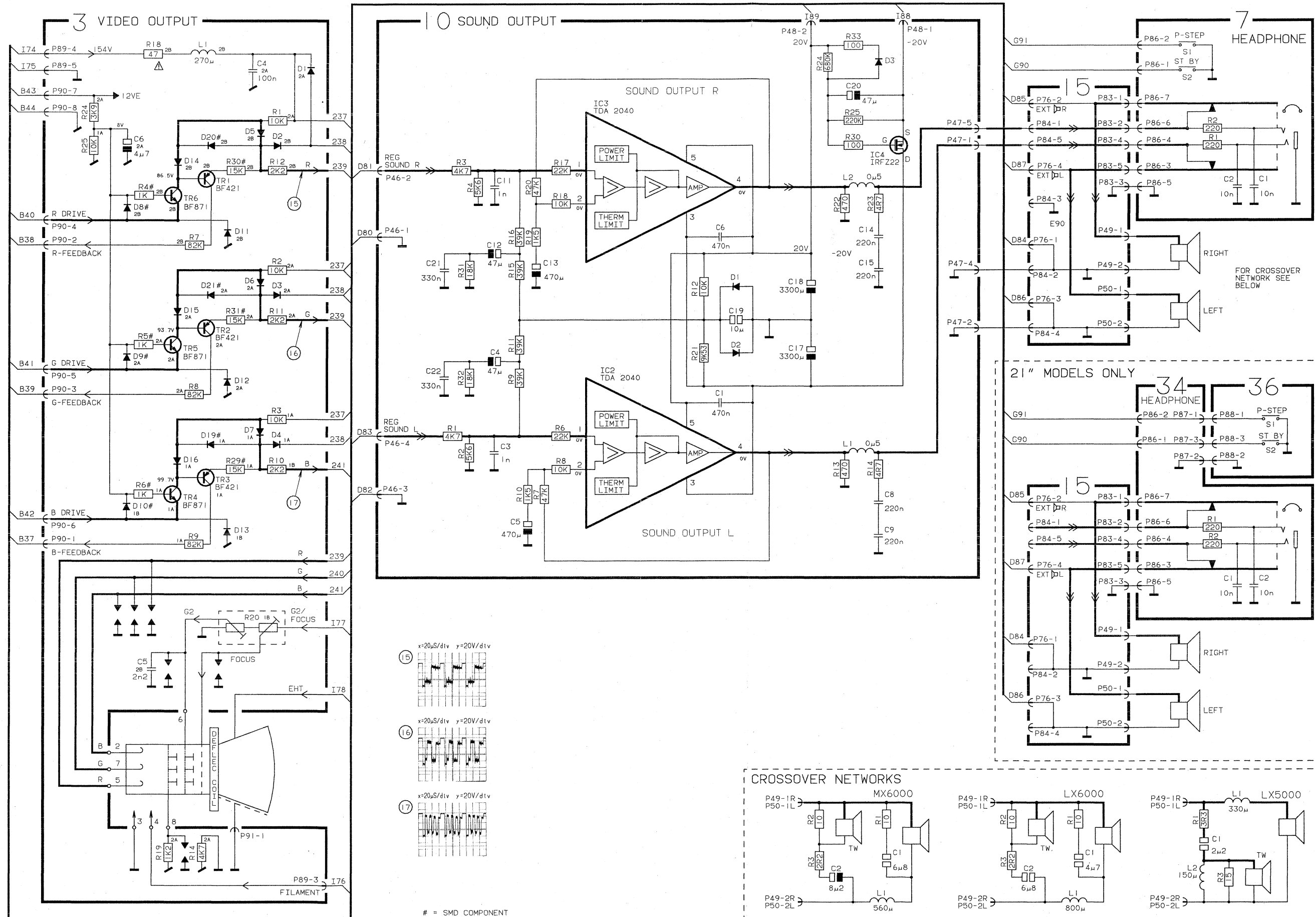












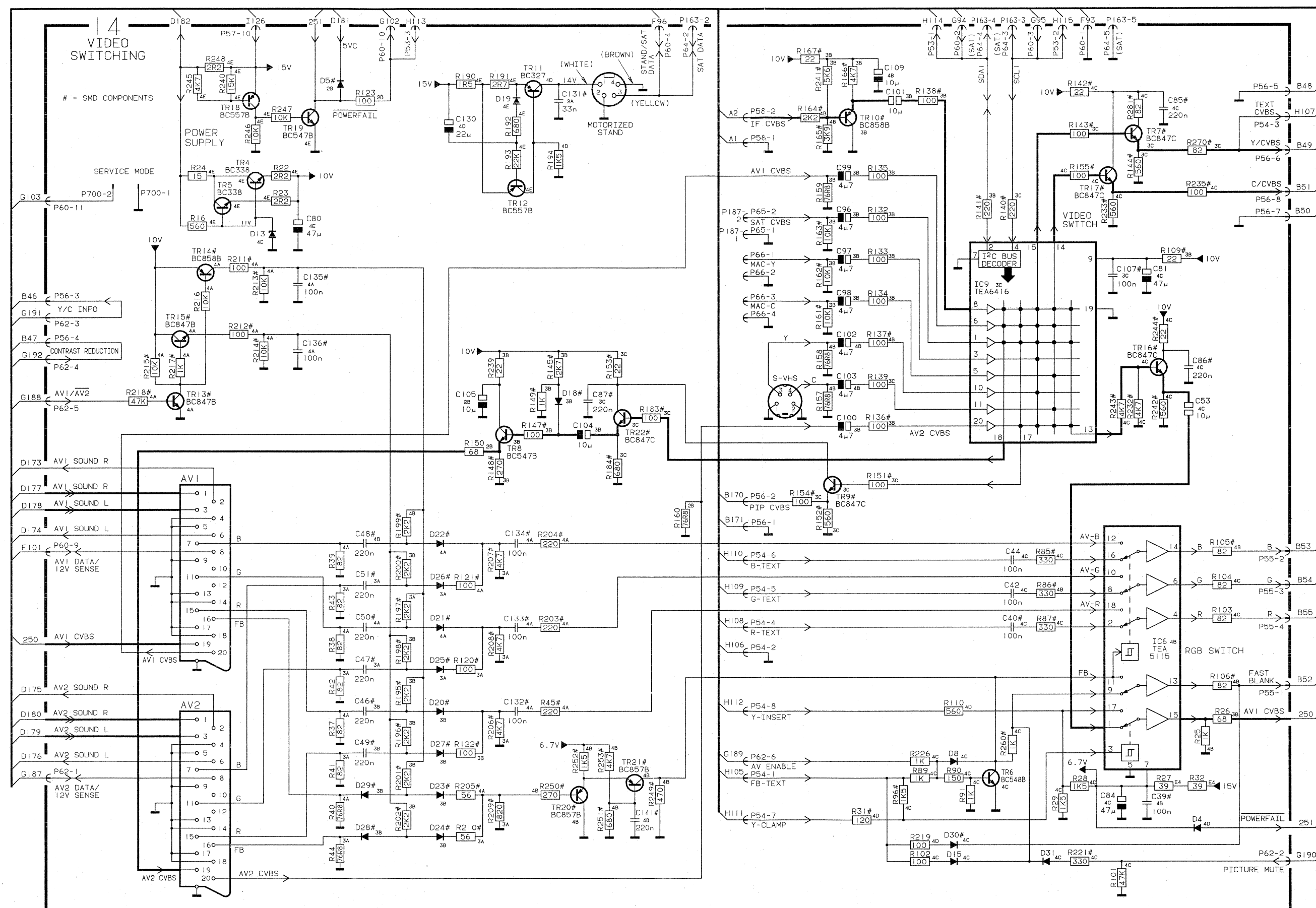
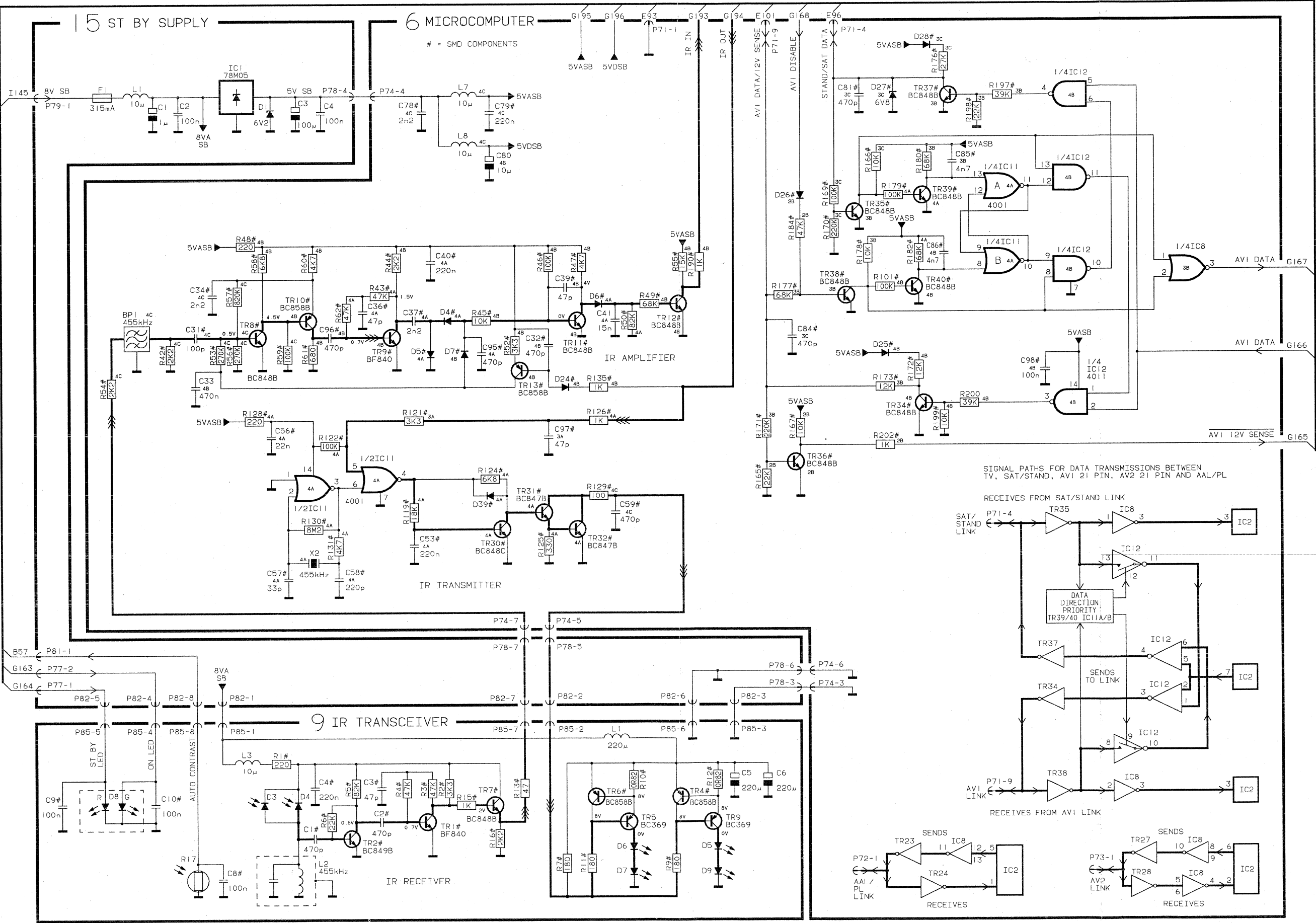
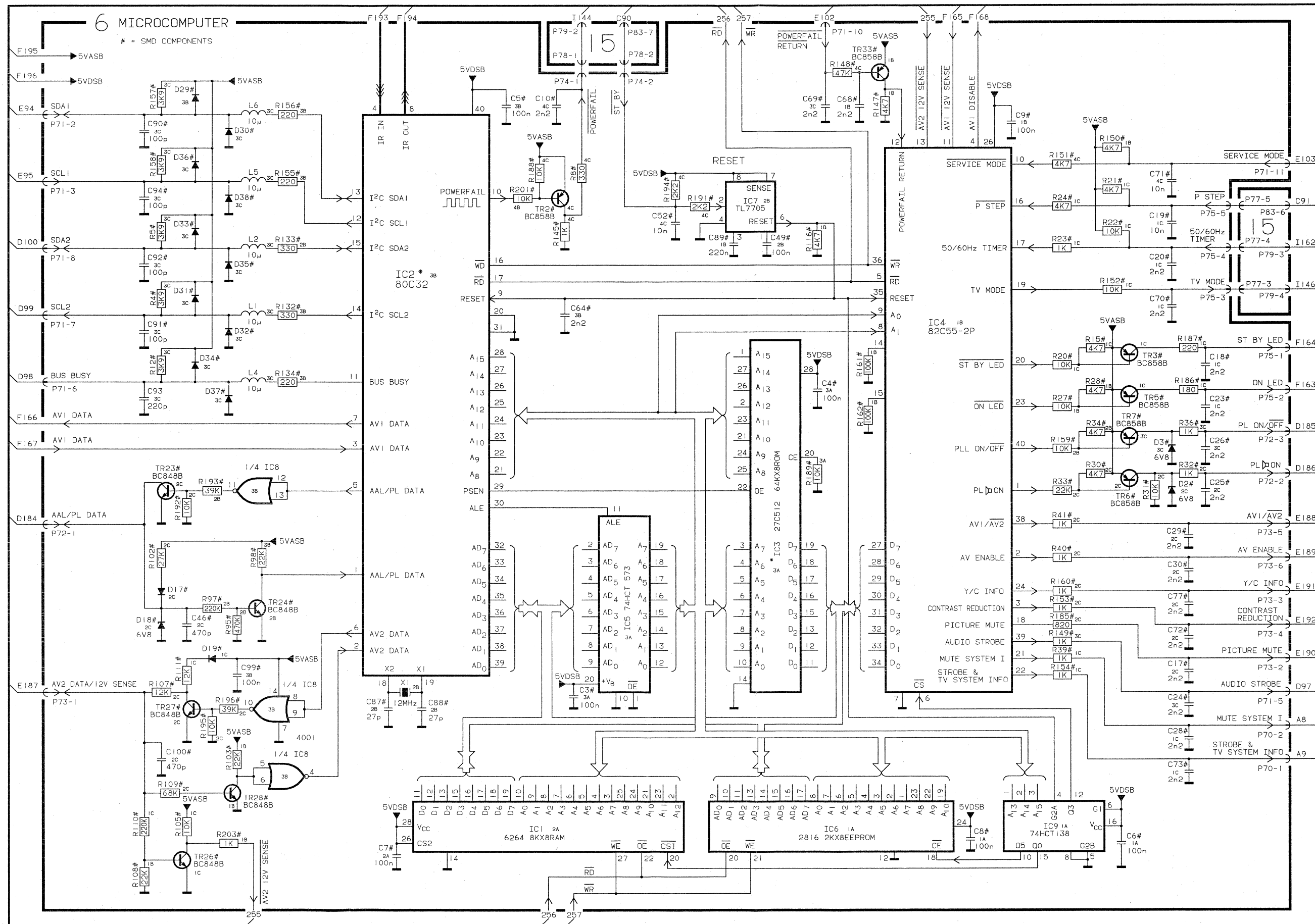


DIAGRAM F IR TRANSCIVER AND 5V ST BY SUPPLY





OSCILLOSCOPE PICTURES FOR POWER SUPPLY & DEFLECTION

PCB 14

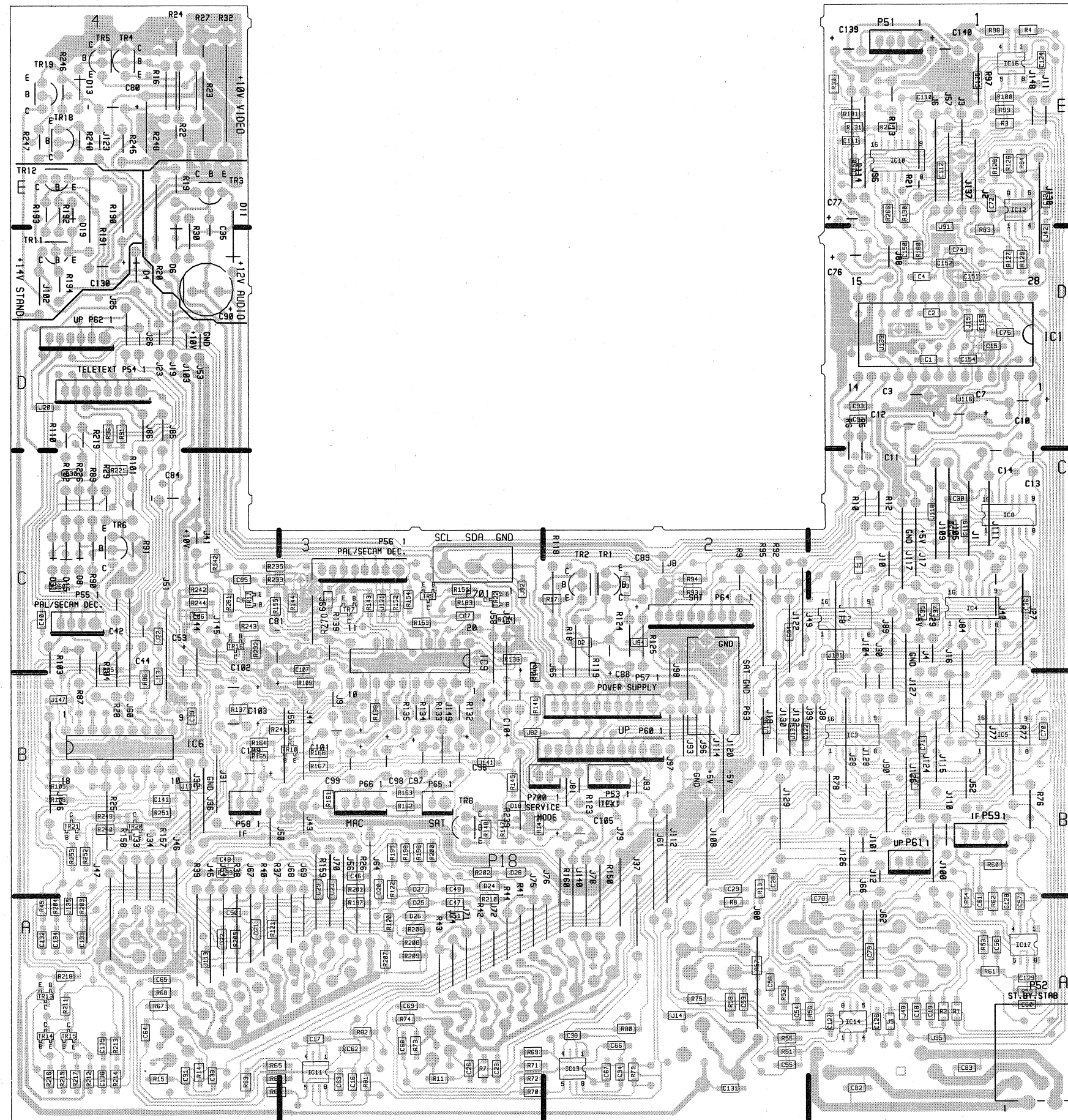
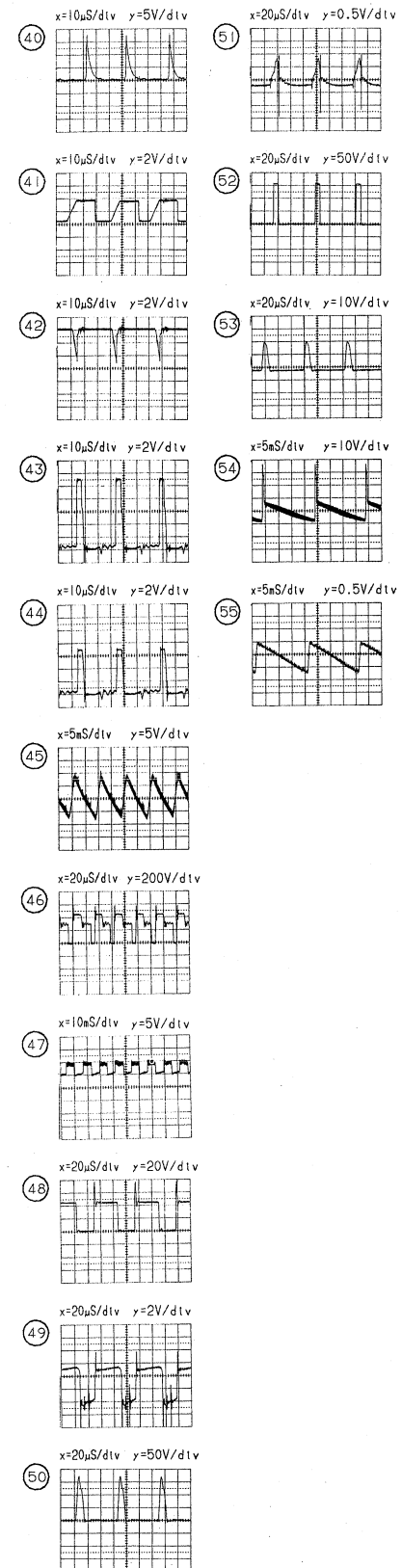


DIAGRAM H TELETEXT AND SYNC PROCESSING

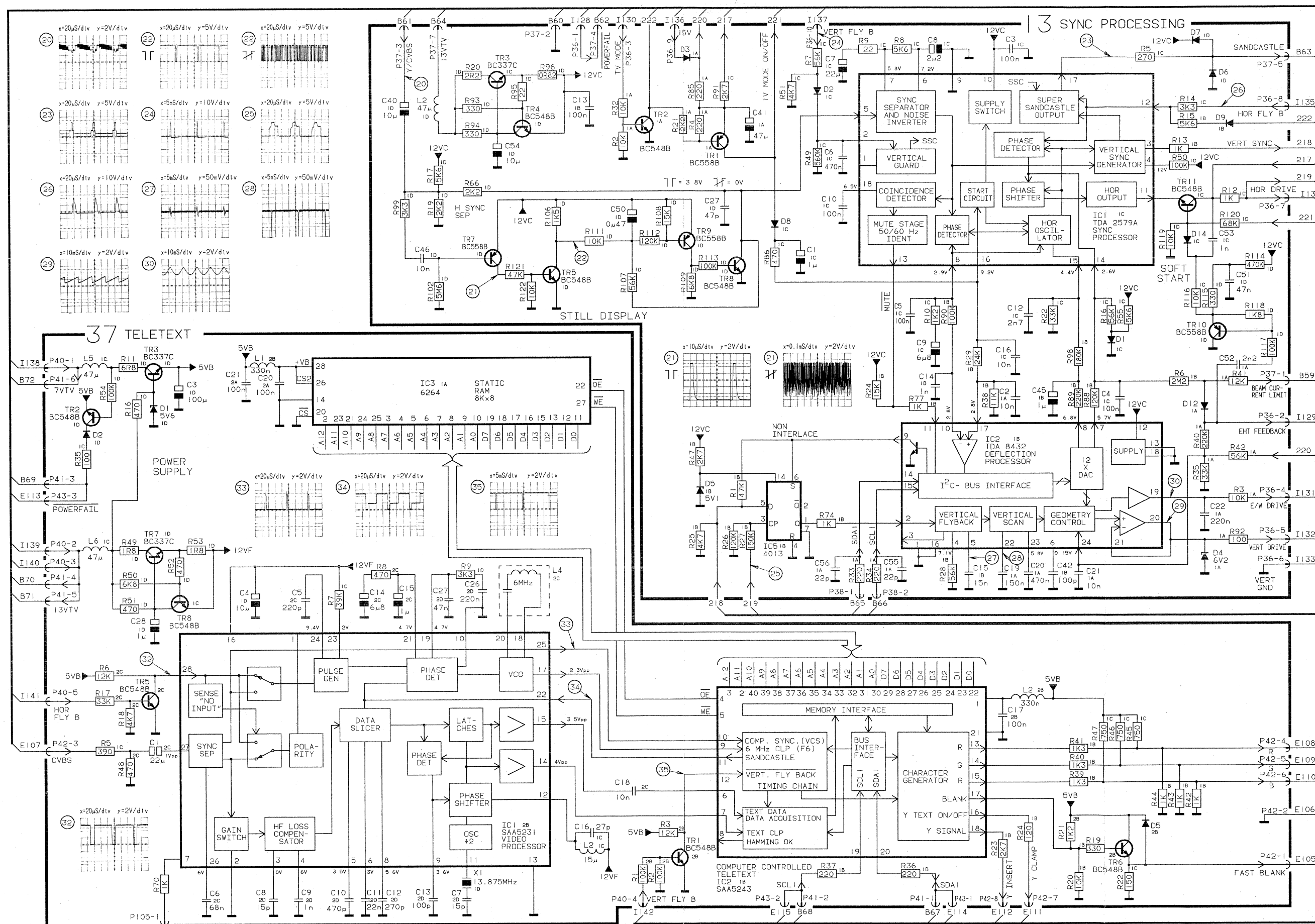
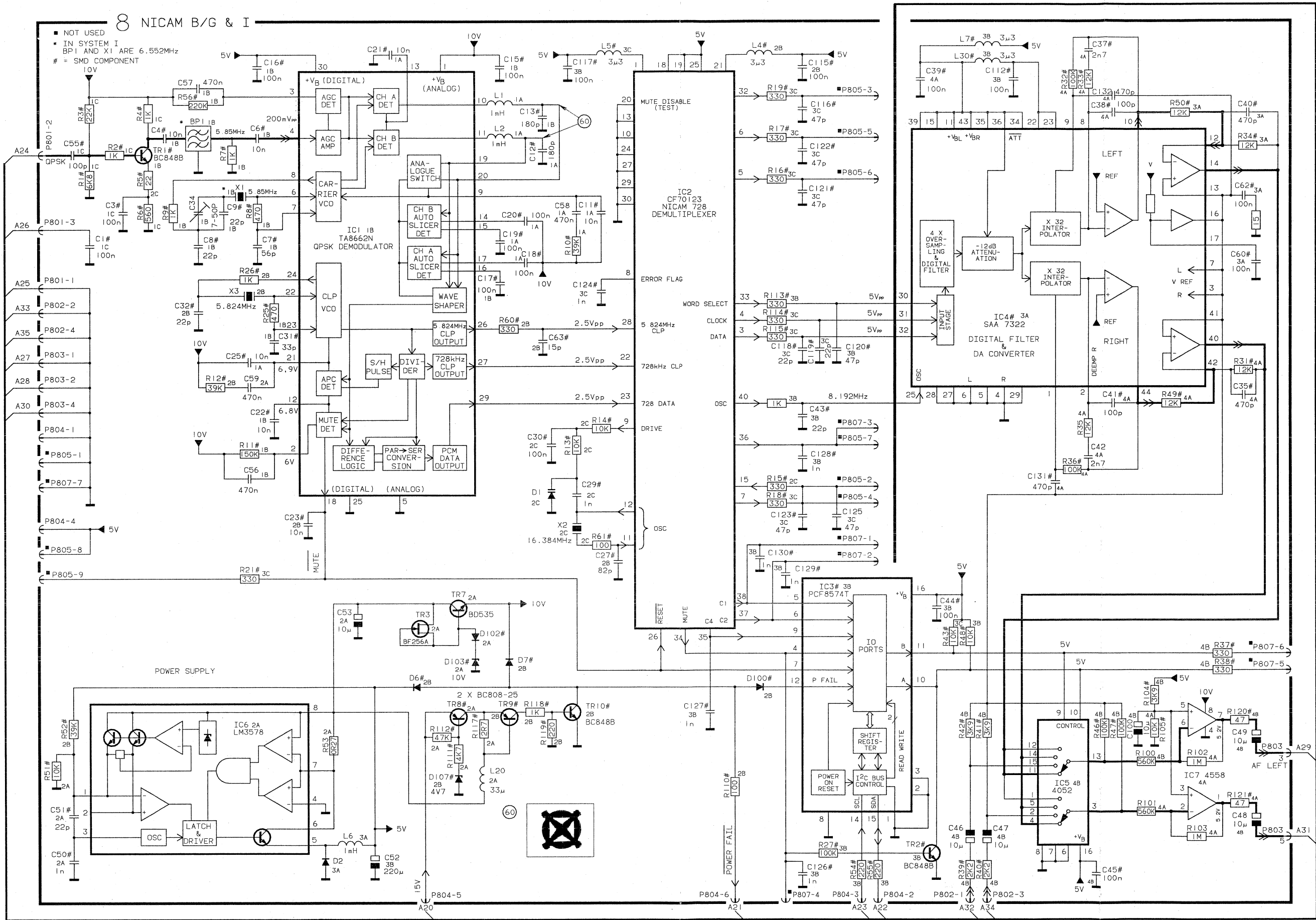
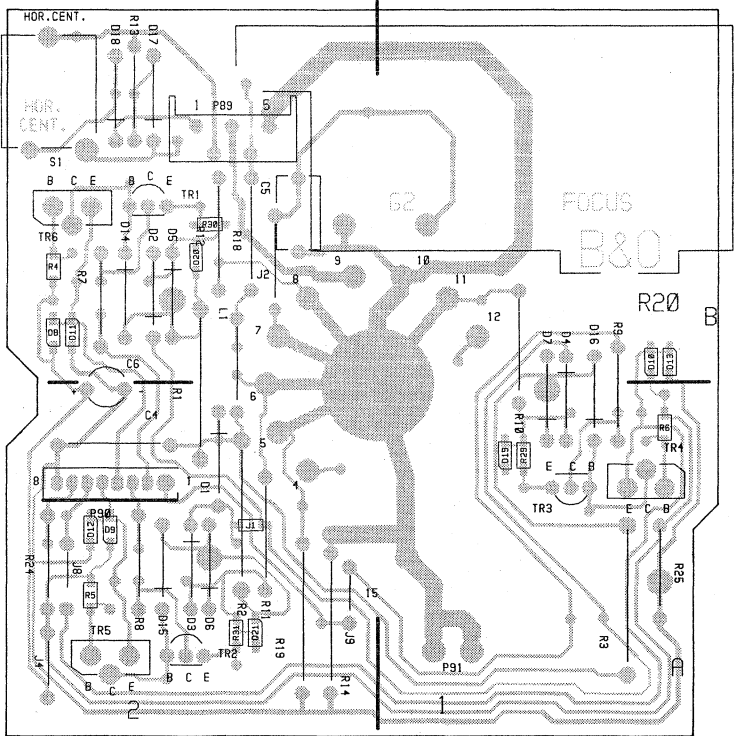
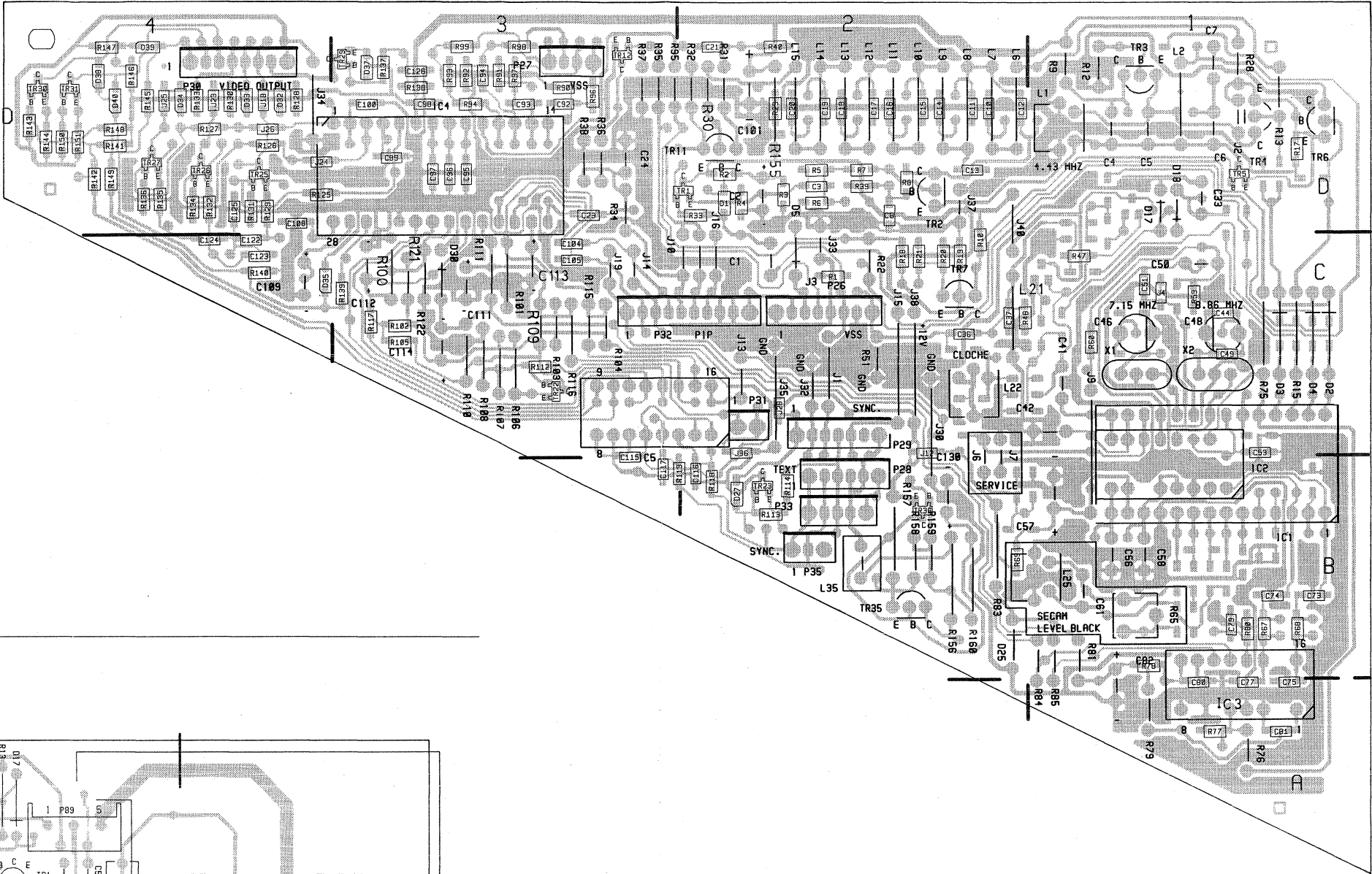


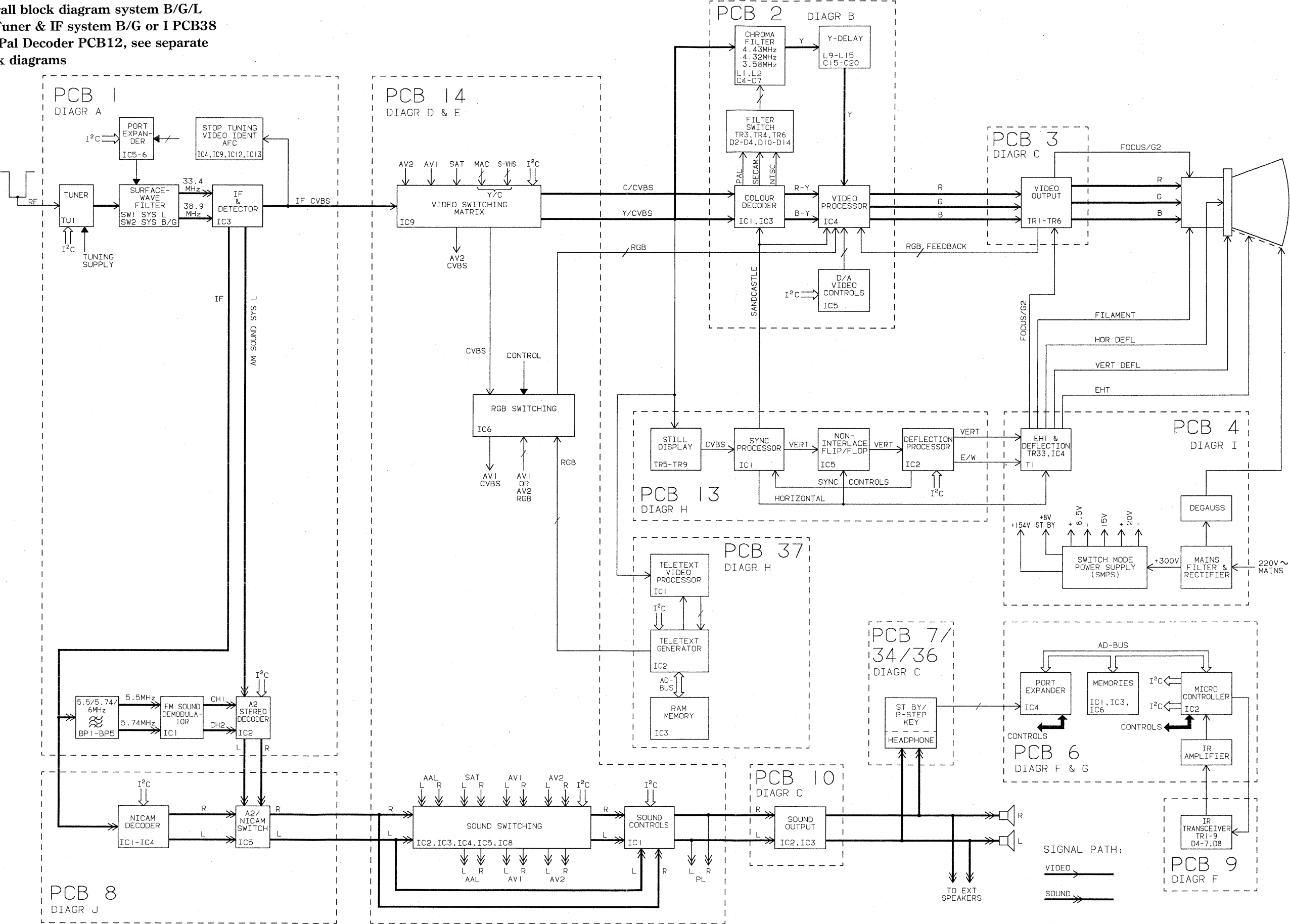
DIAGRAM J NICAM SYSTEM B/G & I





OVERALL BLOCK DIAGRAM

Overall block diagram system B/G/L for Tuner & IF system B/G or I PCB38 and Pal Decoder PCB12, see separate block diagrams



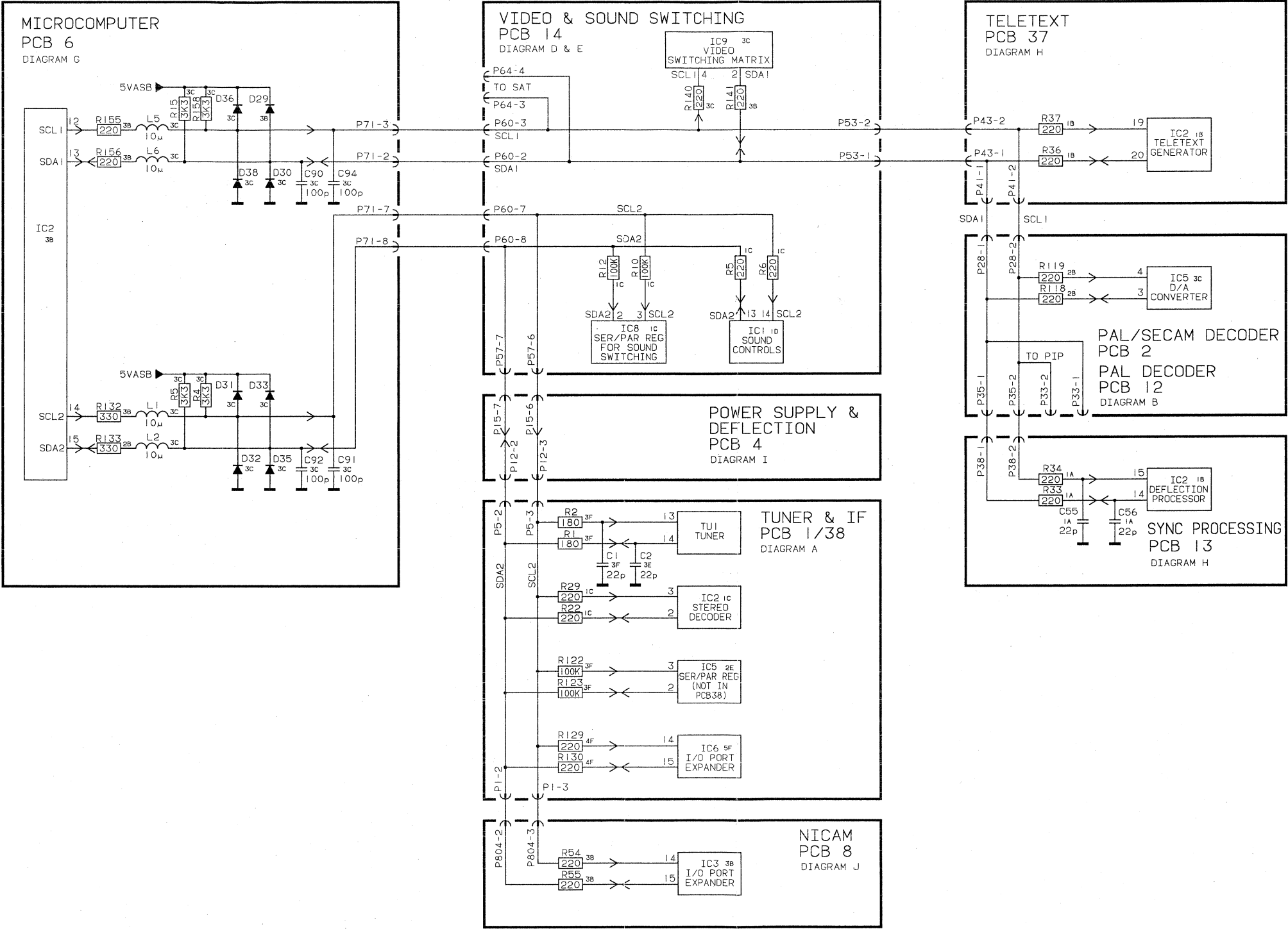
The diagram illustrates the power supply system for a television set, featuring several interconnected PCBs (Printed Circuit Boards) and their components. The main components include:

- POWER SUPPLY & DEFLECTION PCB4 (DIAGR. I):** This board is responsible for generating the high-voltage (154V) and deflection voltages (8VSB, 15V, 8.5V, 20V, -20V, 8VSB). It includes a transformer (T1, T2), a diode (D78), and a feedback network (R126, D75, R91, R127).
- SOUND OUTPUT PCB10 (DIAGR. C):** This board provides the sound output, featuring a transformer (T1, T2) and a diode (D78).
- ST BY SUPPLY PCB15 (DIAGR. F):** This board provides the standby supply, including a transformer (T1, T2) and a diode (D78).
- IR TRANSCEIVER PCB9 (DIAGR. F):** This board provides the infrared transceiver, including a transformer (T1, T2) and a diode (D78).
- MICROCOMPUTER PCB6 (DIAGR. F&G):** This board provides the microcomputer, including a transformer (T1, T2) and a diode (D78).
- TELETEXT PCB37 (DIAGR. H):** This board provides the teletext, including a transformer (T1, T2) and a diode (D78).
- VIDEO OUTPUT PCB3 (DIAGR. C):** This board provides the video output, including a transformer (T1, T2) and a diode (D78).
- SYNC PROCESSING PCB13 (DIAGR. H):** This board provides the sync processing, including a transformer (T1, T2) and a diode (D78).
- PAL/SECAM DECODER PCB2 (DIAGR. B):** This board provides the PAL/SECAM decoder, including a transformer (T1, T2) and a diode (D78).
- BEOSAT LM:** This component is connected to the power supply and deflection PCB4.
- BEAM CURRENT LIMIT:** This component is connected to the video output PCB3.

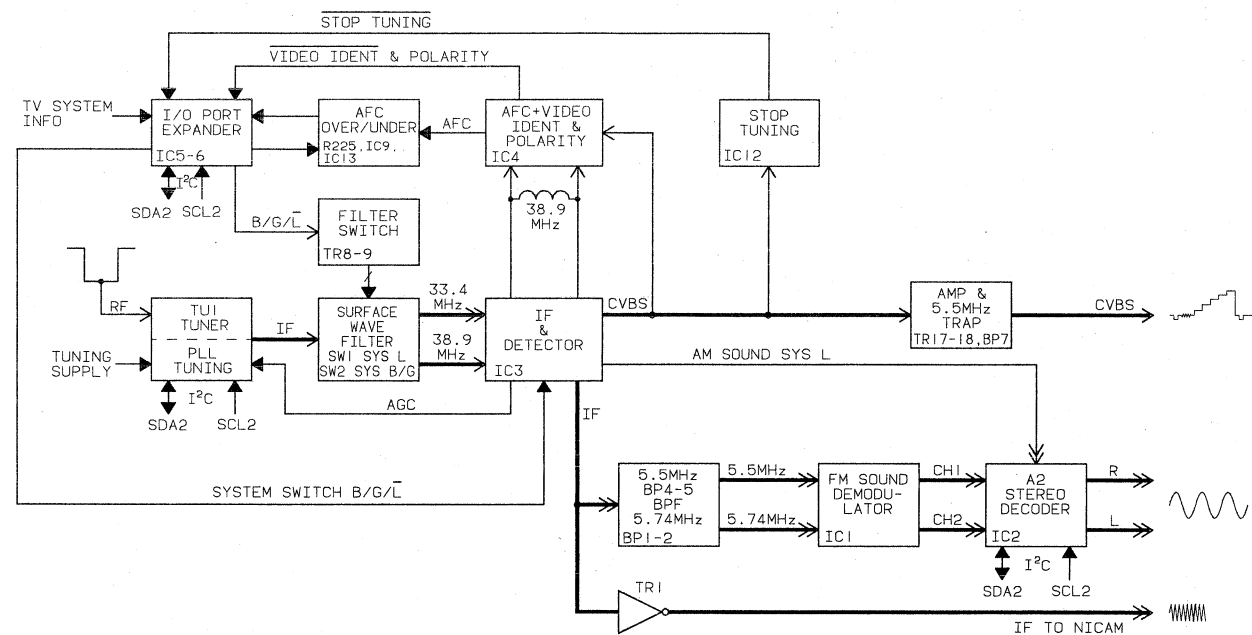
The diagram also shows the power supply system for the A/V switching PCB14 (DIAGR. D&E), which includes a transformer (T1, T2) and a diode (D78). The power supply system is designed to provide a stable and reliable power source for the television set, ensuring optimal performance and longevity.

AT POWER-UP, THE POWER FAIL RETURN INFORMATION IS IGNORED FOR 400ms IN ORDER THAT THE VARIOUS POWER STABILIZATIONS MAY HAVE TIME TO ADJUST. DURING THE 400ms PERIOD IT IS POSSIBLE TO MEASURE E.G. WHERE THE PULSATING VOLTAGE IS LOADED IN THE POWER FAIL SYSTEM.

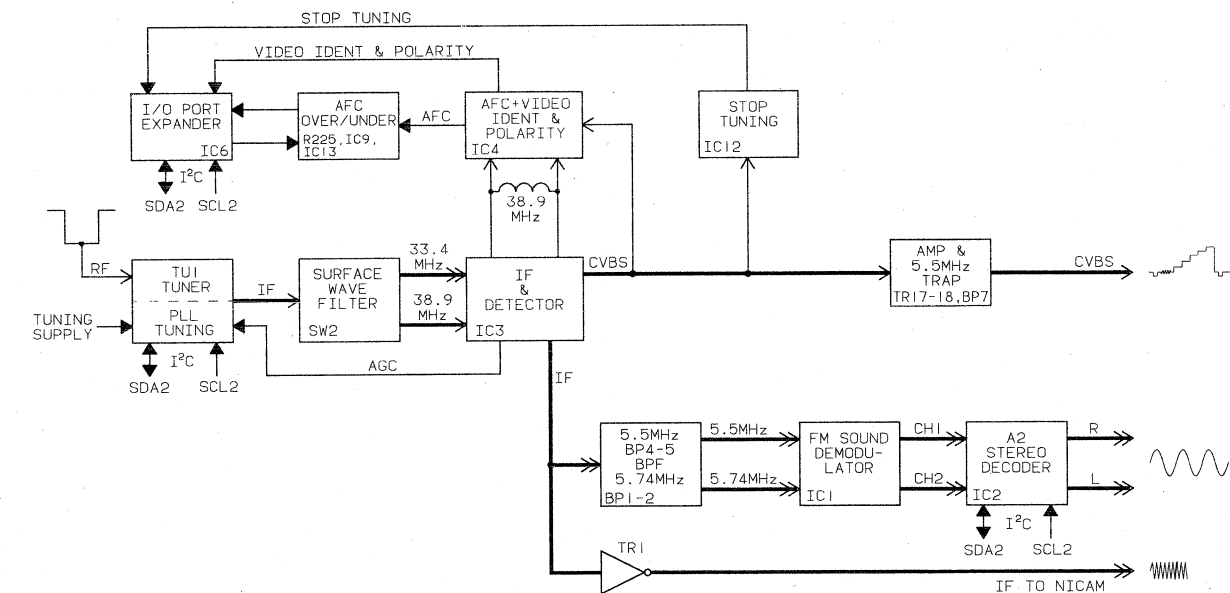
AT POWER-UP, THE POWER FAIL RETURN INFORMATION IS IGNORED FOR 400mS IN ORDER THAT THE VARIOUS POWER STABILIZATIONS MAY HAVE TIME TO ADJUST. DURING THE 400mS PERIOD IT IS POSSIBLE TO MEASURE E.G. WHERE THE PULSATING VOLTAGE IS LOADED IN THE POWER FAIL SYSTEM.



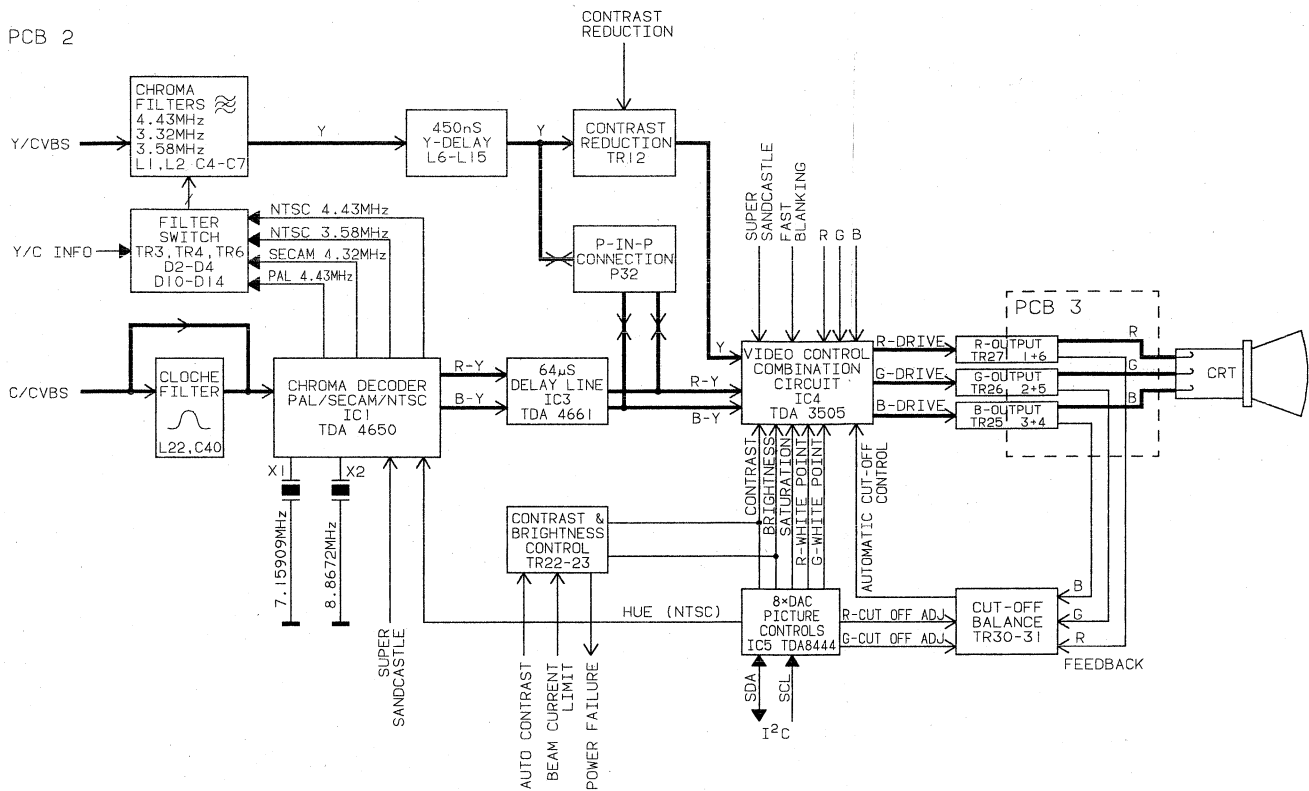
BLOCK DIAGRAM TUNER & IF SYSTEM B/G/L



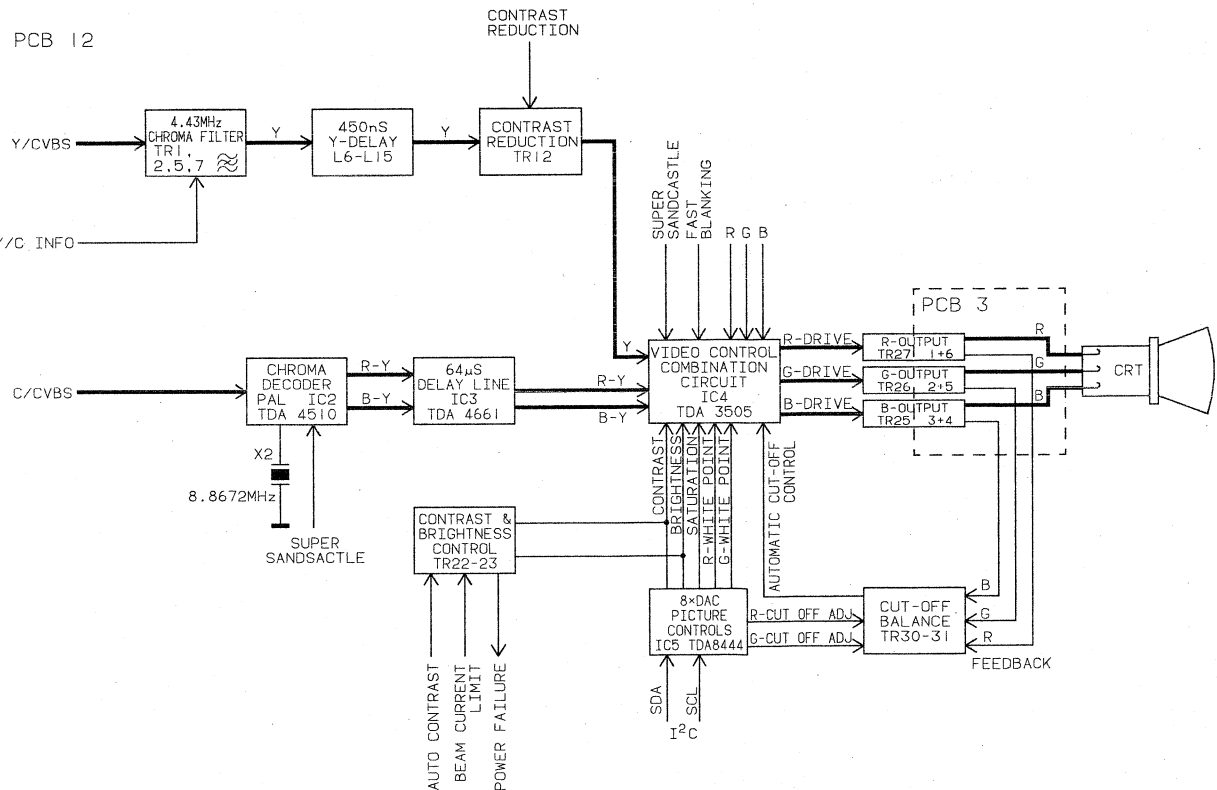
BLOCK DIAGRAM TUNER & IF SYSTEM B/G & I



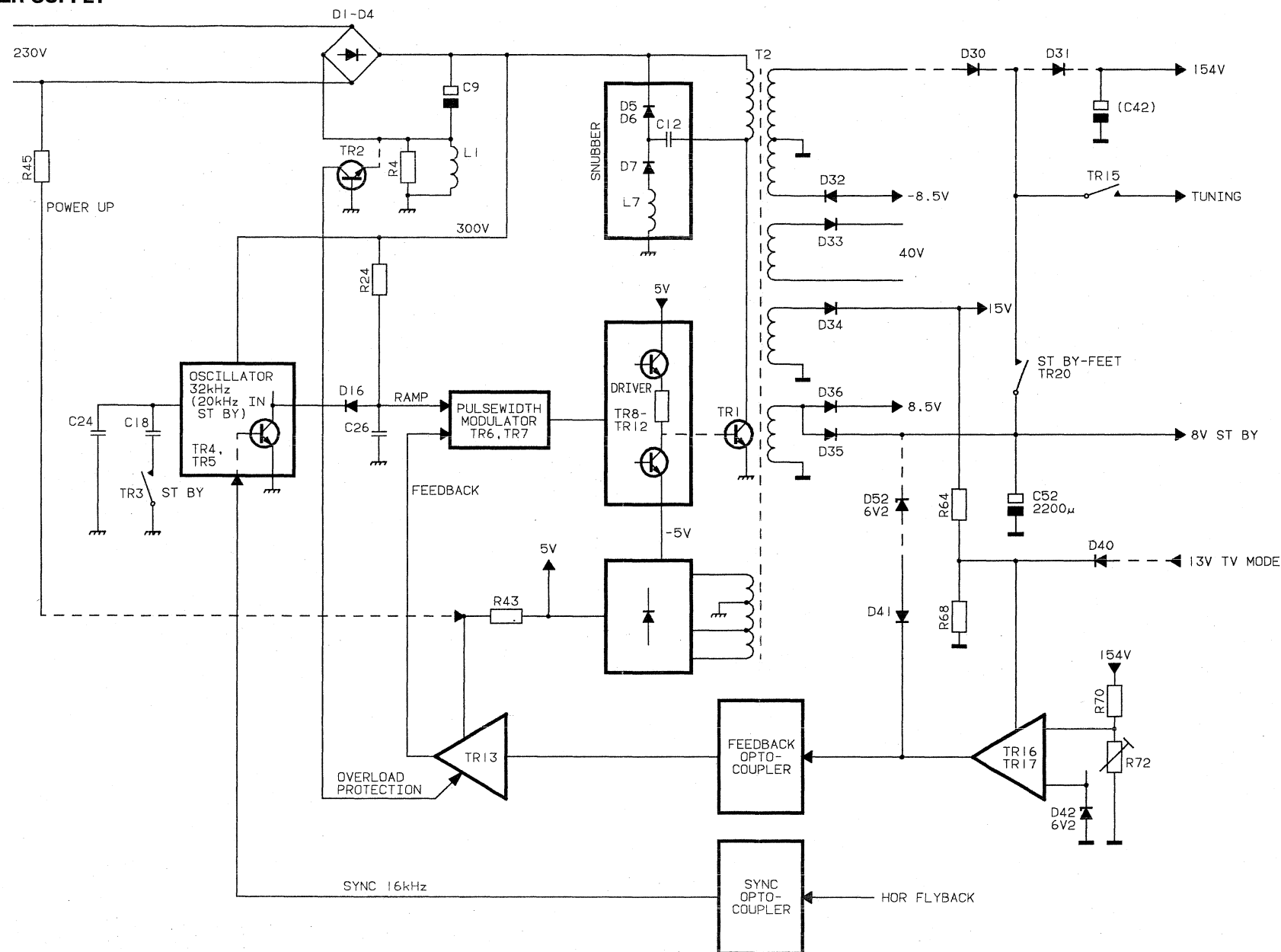
BLOCK DIAGRAM PAL/SECAM DECODER



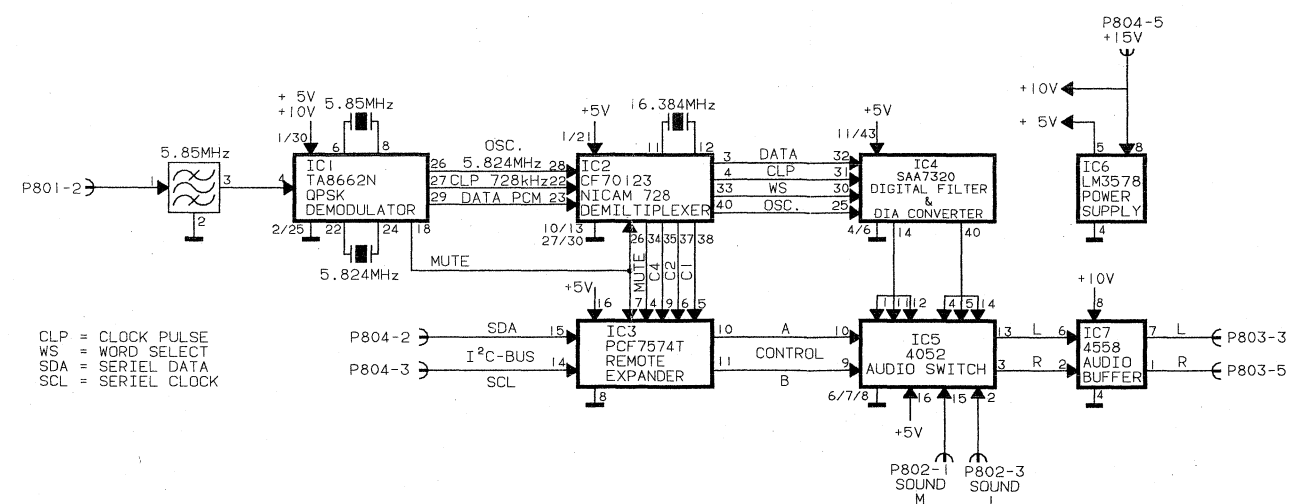
BLOCK DIAGRAM PAL DECODER



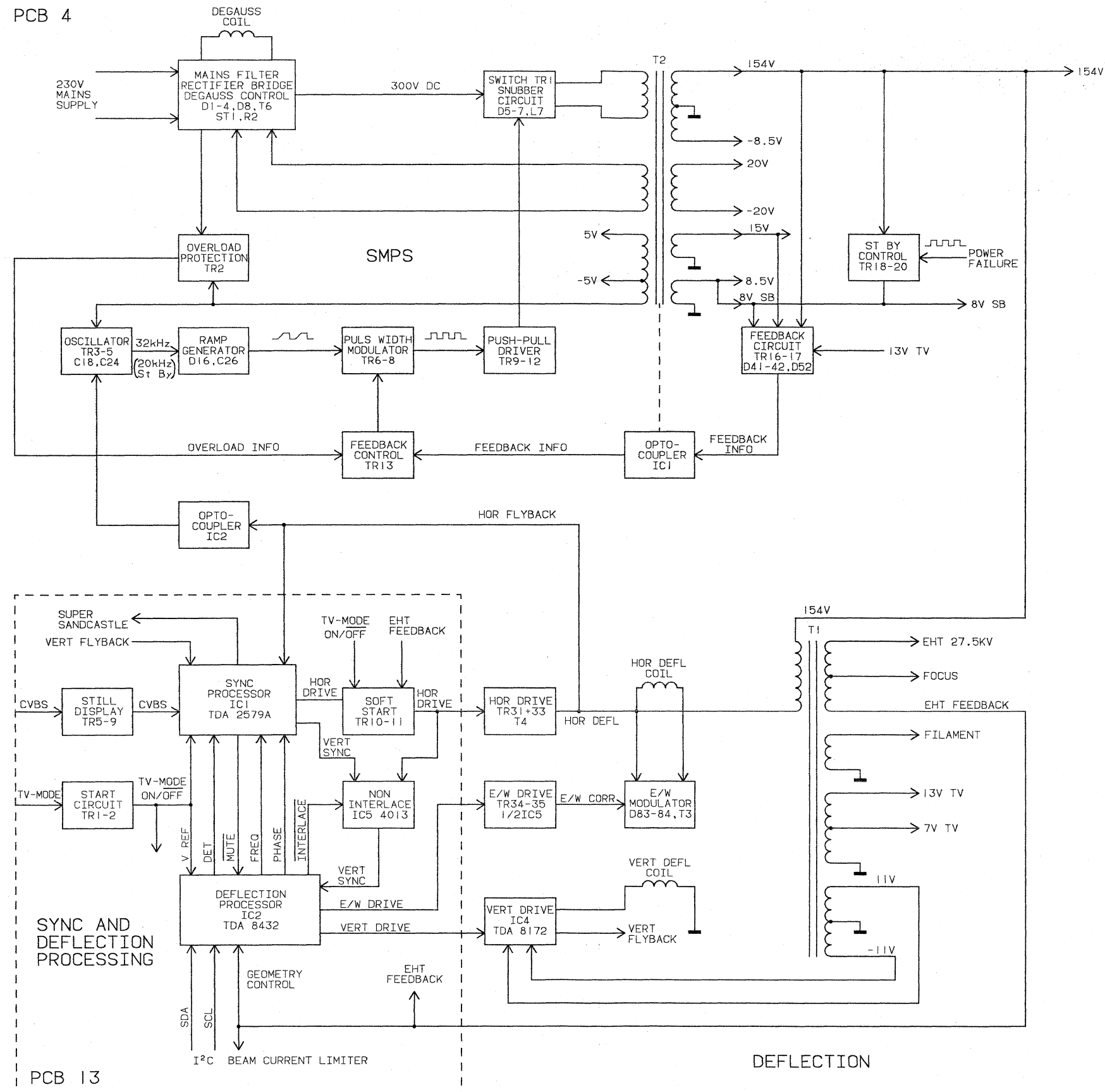
BLOCK DIAGRAM SWITCH MODE POWER SUPPLY



BLOCK DIAGRAM NICAM



BLOCK DIAGRAM POWER SUPPLY & DEFLECTION



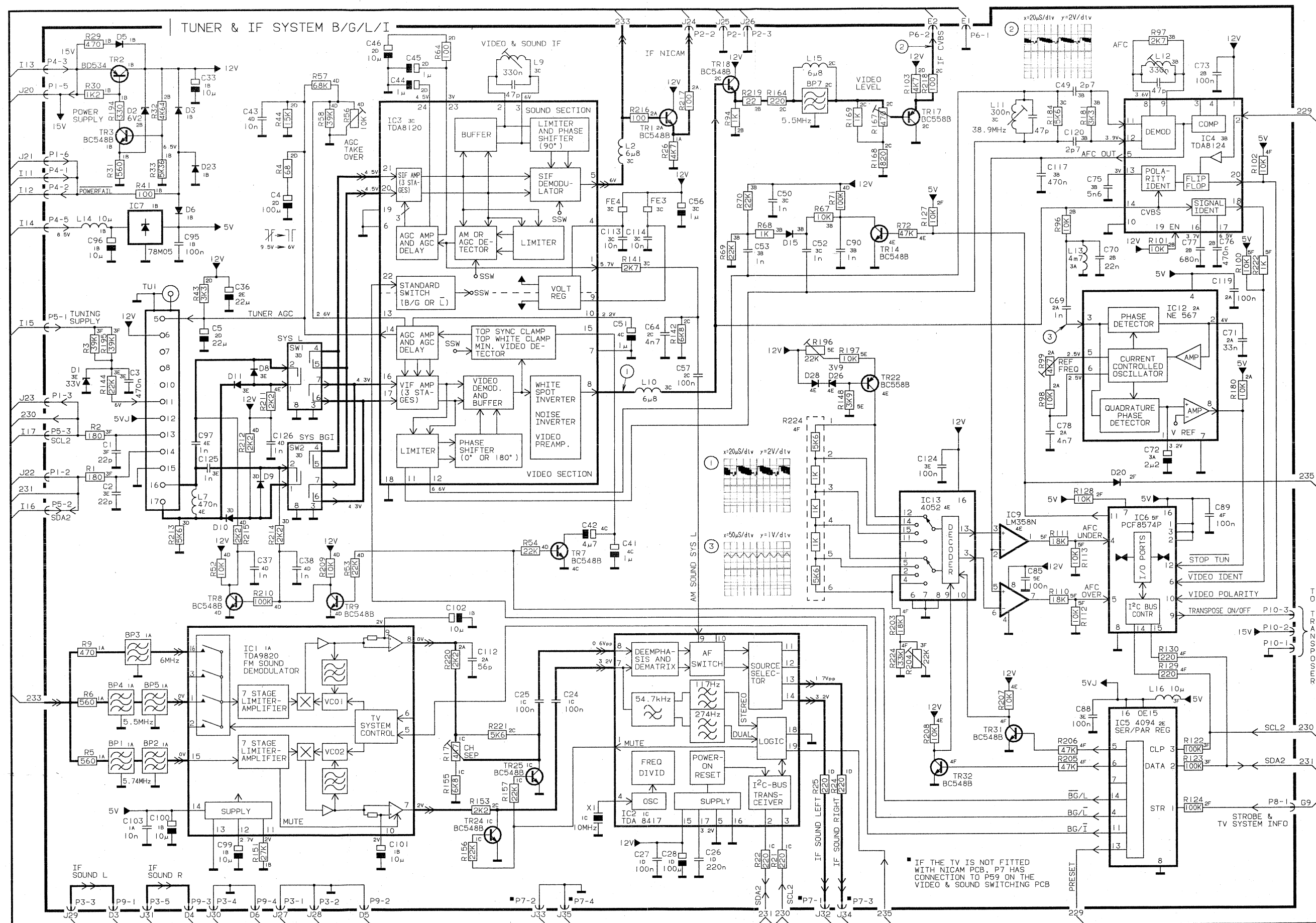


DIAGRAM A TUNER & IF SYSTEM B/G/D/K

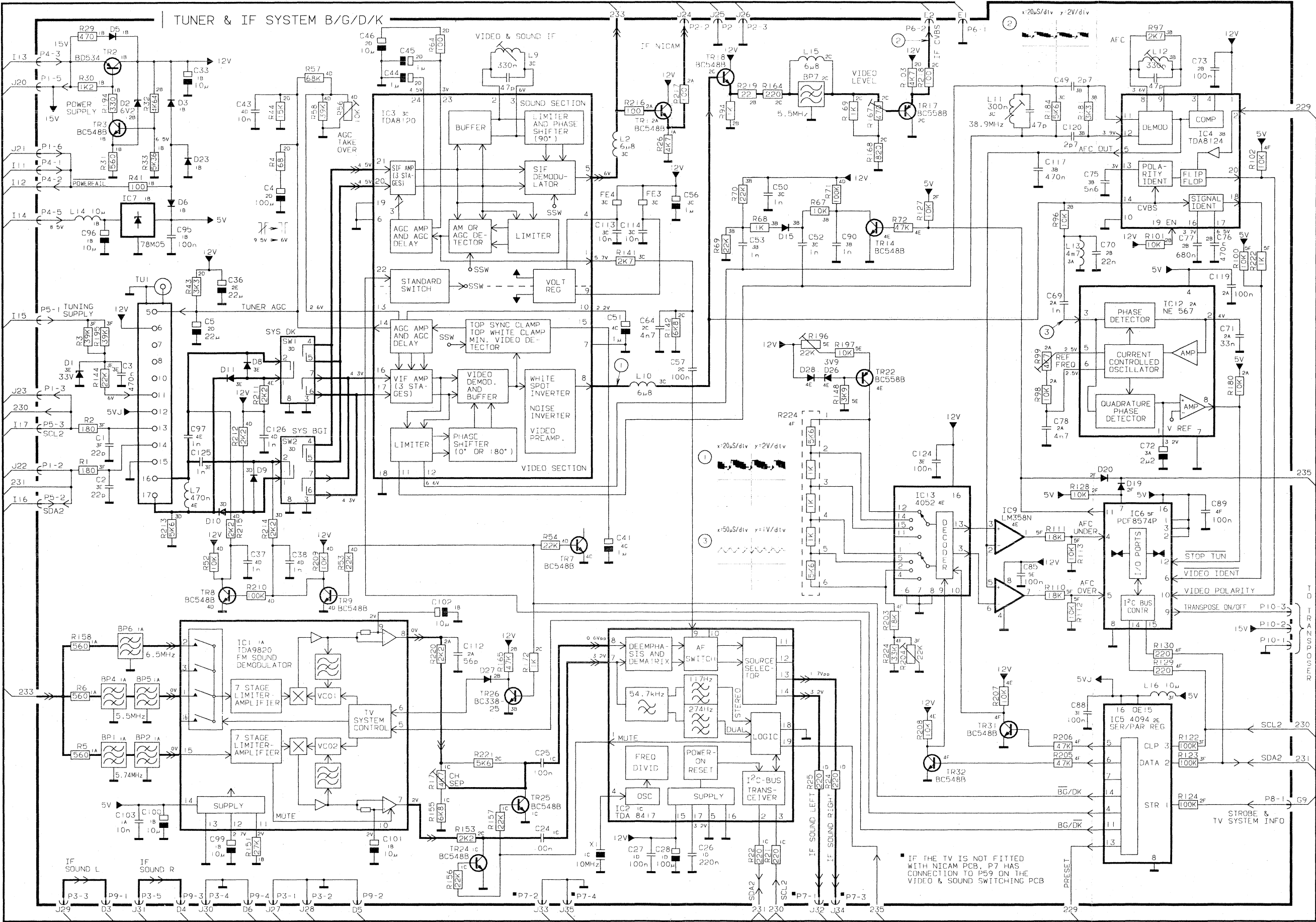


DIAGRAM A TUNER & IF SYSTEM B/G/M

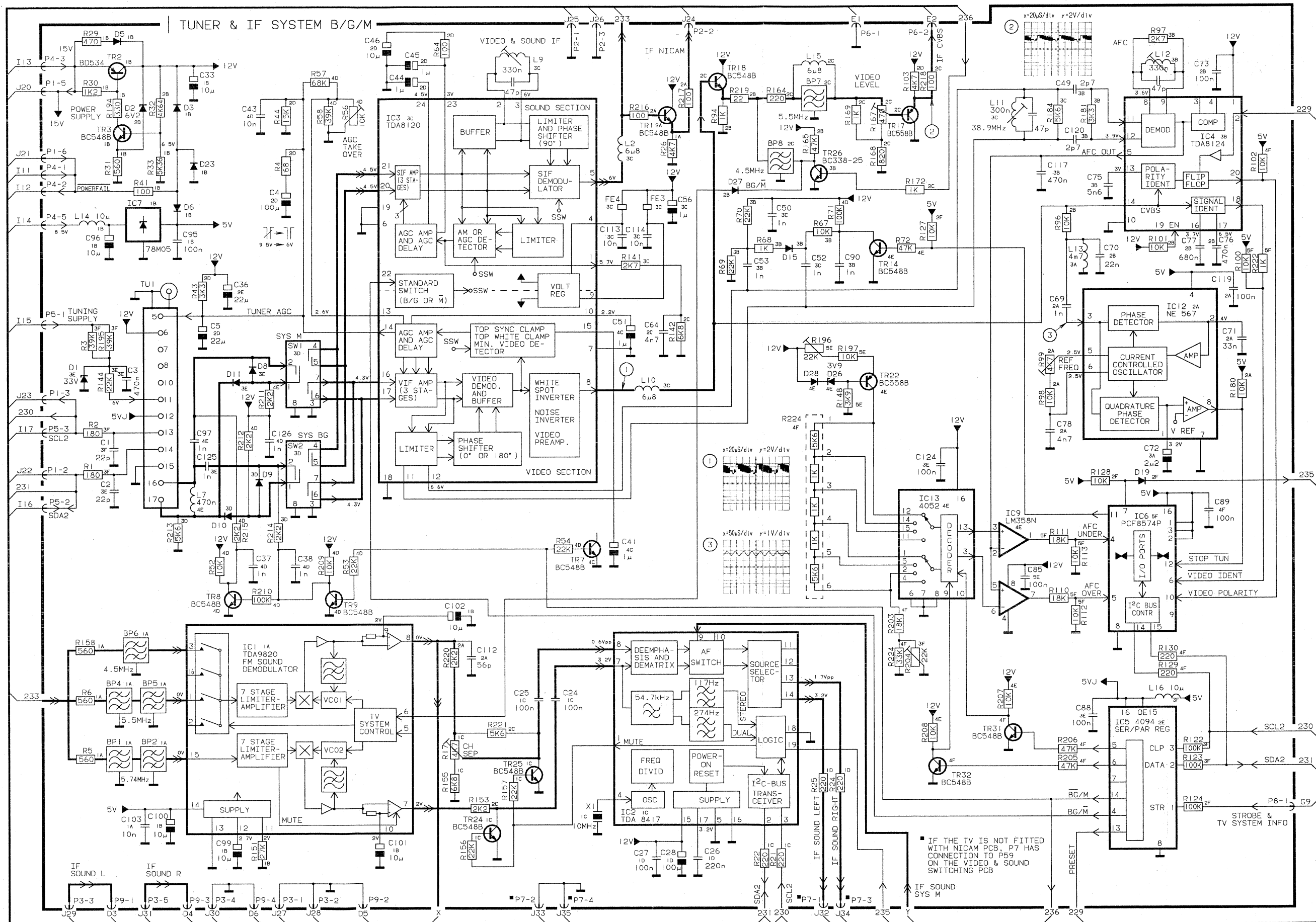
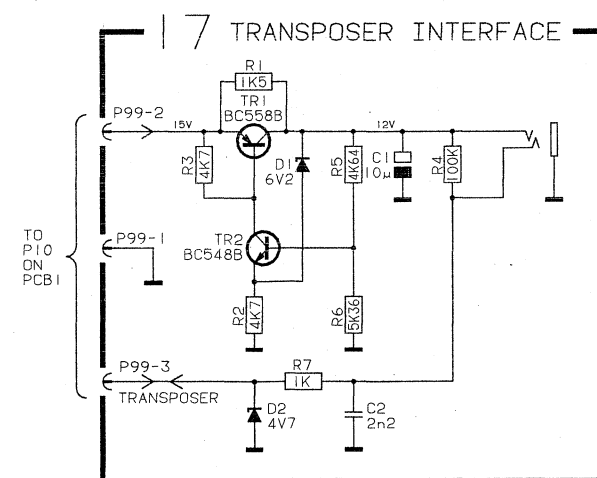
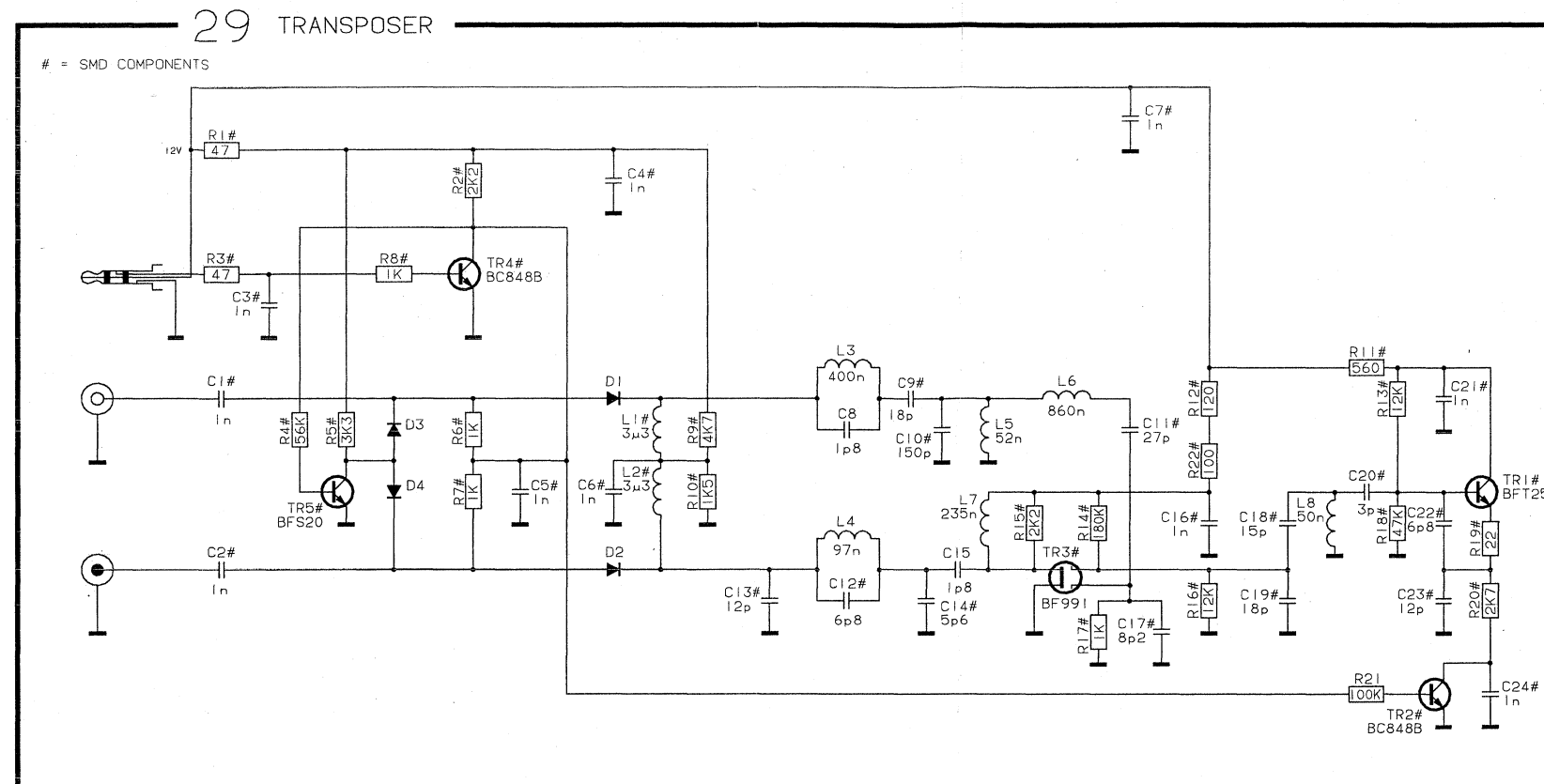
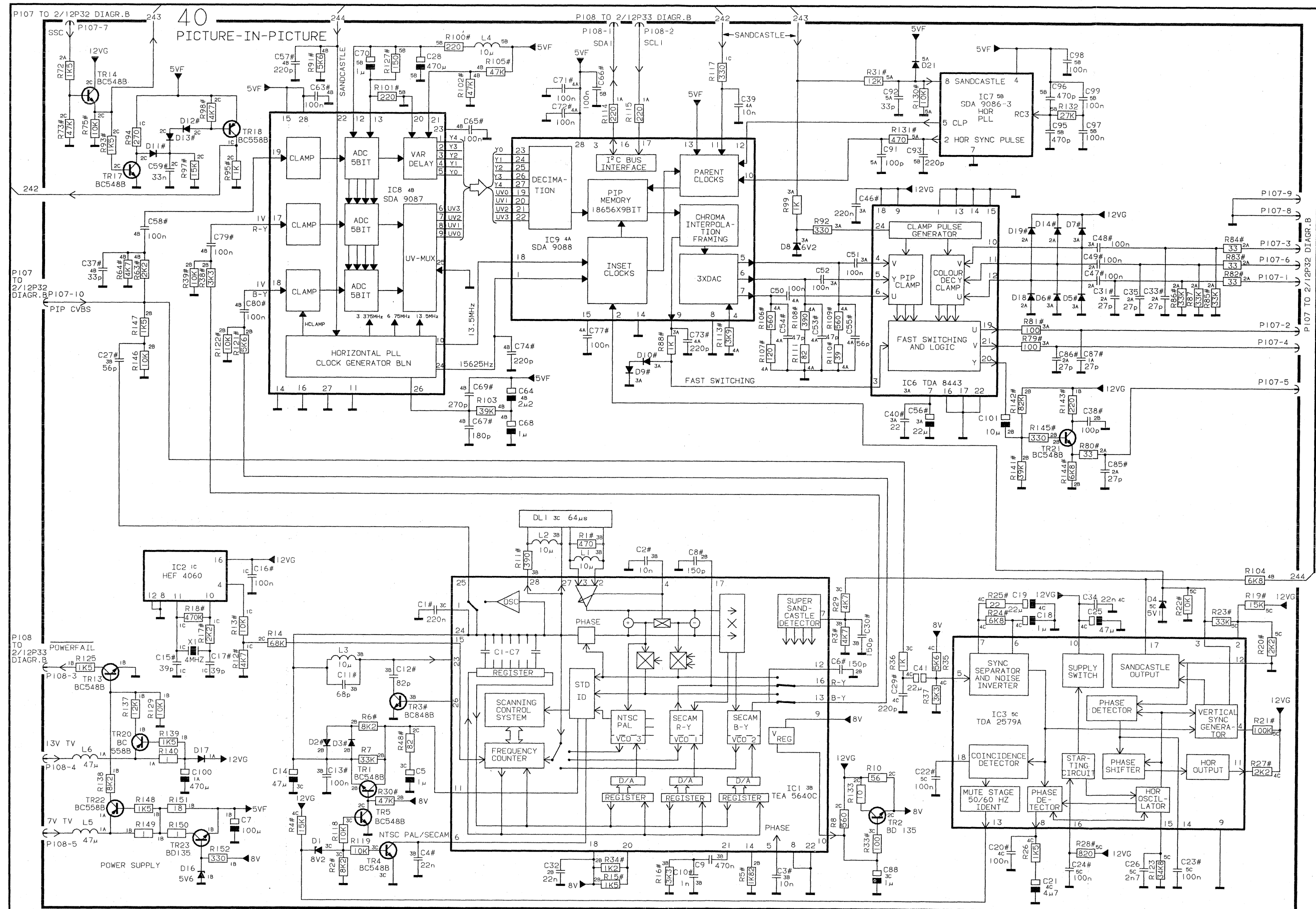


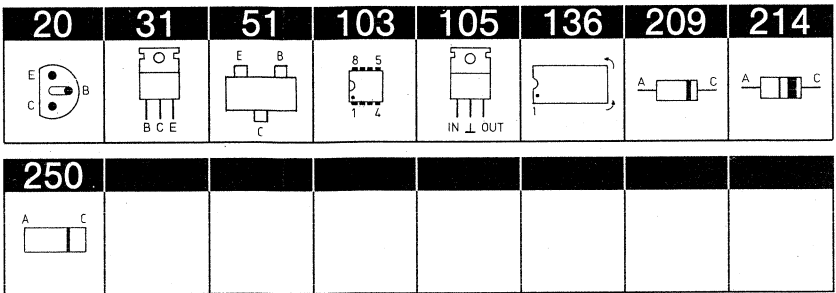
DIAGRAM TRANSPOSER





LIST OF ELECTRICAL PARTS

PCB 1, 8007449
Tuner & IF B/G/L



Resistors not referred to are standard, see page 3-20

IC1	8341569	136	TDA 9820	IC6Δ	8341158	136	PCF 8574P
IC2	8341794	136	TDA 8417	IC7	8340212	105	78M05
IC3	8341137	136	TDA 8120	IC9	8340569	103	LM 358
IC4	8341142	136	TDA 8124	IC12	8341311	103	NE 567
IC5Δ	8340782	136	4094	IC13Δ	8340602	136	4052

TR1	8320509	20	BC 548B	TR17	8320510	20	BC558B
TR2*	8320369	31	BD 534	TR18	8320509	20	BC548B
	3358267		Heat sink	TR22	8320510	20	BC558B
			f/TR2	TR24-	8320509	20	BC548B
TR3	8320509	20	BC548B	TR25			
TR7-	8320509	20	BC548B	TR31-	8320509	20	BC548B
TR9				TR32			
TR14	8320509	20	BC548B				

D1	8300803	214	ZP33V 0.4W	D15	8300478	209	BA 483
D2	8300596	209	ZPD6.2V 0.4W	D23	8300779	214	1N 4531
D3	8300779	214	1N 4531	D26	8300404	209	ZPD3.9V 0.4W
D5-	8300779	214	1N 4531	D28	8300779	214	1N 4531
D6							
D8-	8300478	209	BA 483				
D11							

R17	5370370	4.7kΩ	30% 0.3W	R167	5370432	470Ω	30% 0.3W
R32	5021305	4.64kΩ	1% 1/8W	R196	5370403	22kΩ	30% 0.1W
R33	5021306	5.36kΩ	1% 1/8W	R204	5370403	22kΩ	30% 0.1W
R56	5370381	10kΩ	30% 0.1W	R225	5030037	2 x 5.6kΩ +	
R99	5370370	4.7kΩ	30% 0.3W			3 x 1kΩ	SIL
R151	5021304	27kΩ	1% 1/8W				

C3	4130313	470nF	20% 63V	C52-	4010105	1nF	10% 50V
C4	4200628	100μF	-20+50% 16V	C53			
C5	4200544	22μF	20% 16V	C56	4200512	1μF	20% 50V
C24-	4130230	100nF	20% 63V	C57	4130230	100nF	20% 63V
C25				C64	4100239	4.7nF	5% 63V
C26	4130233	220nF	20% 63V	C69	4010105	1nF	10% 50V
C27	4130230	100nF	20% 63V	C70	4130262	22nF	20% 63V
C28	4200628	100μF	-20+50% 16V	C71	4130257	33nF	20% 63V
C33	4200510	10μF	20% 16V	C72	4200517	2.2μF	20% 50V
C36	4200544	22μF	20% 16V	C73	4130230	100nF	20% 63V
C37-	4010105	1nF	10% 50V	C75	4130347	5.6nF	10% 63V
C38				C76	4130313	470nF	20% 63V
C41	4200512	1μF	20% 50V	C77	4130311	680nF	10% 63V
C42	4200515	4.7μF	20% 25V	C78	4010241	4.7nF	5% 50V
C43	4010106	10nF	-20+80% 40V	C85	4130230	100nF	20% 63V
C44-	4200512	1μF	20% 50V	C88-	4130230	100nF	20% 63V
C45				C89			
C46	4200510	10μF	20% 16V	C90	4010105	1nF	10% 50V
C49	4000380	2.7pF	±0.25pF 50V	C95	4130230	100nF	20% 63V
C50	4010105	1nF	10% 50V	C96	4200510	10μF	20% 16V
C51	4200512	1μF	20% 50V	C97	4010105	1nF	10% 50V

Δ indicates that static electricity may destroy the component.
*Specially selected or adapted sample.

PCB 1, 8007997
Tuner & IF B/G/M
(Accessories)

C99-	4200510	10μF	20% 16V	C117	4130234	470nF	10% 63V
C102				C119	4130230	100nF	20% 63V
C103	4010106	10nF	-20+80% 40V	C120	4000380	2.7pF	±0.25pF 50V
C112	4000155	56pF	5% 63V	C124	4130230	100nF	20% 63V
C113-	4010106	10nF	-20+80% 40V	C125-	4010105	1nF	10% 50V
C114				C126			

L2	8020595	Coil	6.8μH 10%	L12	8020791	Coil	38.9MHz
L7	8020650	Coil	470nH 5%	L13	8022250	Coil	4.7mH 5%
L9	8020738	Coil	38.9MHz	L14	8020807	Coil	10μH 10%
L10	8020595	Coil	6.8μH 10%	L15	8020729	Coil	6.8μH 5%
L11	8020739	Coil	38.9MHz	L16	8020600	Coil	1μH 10%

BP1-	8030029	Cer filter	5.74MHz ±50kHz
BP2			
BP4	8030021	Cer filter	5.5MHz ±75kHz
BP5	8030026	Cer filter	5.5MHz ±50kHz
BP7	8030218	Cer filter	5.5MHz

SW1	8030082	OFW	K3252
SW2	8030137	OFW	G3264

TU1	8050140	Tuner	MTX 4/PLL
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FE3-	6000038	Ferrite core	
FE4			

X1	8090105	Crystal	10.0MHz
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P1	7220713	Plug	6/6 pole	P6	7220709	Plug	2/2 pole
P2	7220710	Plug	3/3 pole	P7	7220711	Plug	4/4 pole
P3-	7220712	Plug	5/5 pole	P8	7220709	Plug	2/2 pole
P4				P9	7220711	Plug	4/4 pole
P5	7220710	Plug	3/3 pole	P10	7220710	Plug	3/3 pole

IC8Δ	8340340	136	4053
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TR15-	8320509	20	BC 548B	TR26	8320512	20	BC 338-25
TR16				TR28	8320104	20	BC 558B

D19	8300058	209	1N 4148
D27	8300212	209	1N 4448

C104	4200510	10μF	20% 16V	C107	4200510	10μF	20% 16V
C105-	4200525	22μF	20% 10V	C109	4100238	3.3nF	5% 63V
C106				C110	4130306	100nF	10% 63V

BP6	8030124	Cer filter	4.5MHz
BP8	8030223	Cer filter	4.5MHz

SW1	8008011	OFW	G 3450
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Other electrical parts like PCB1, Tuner & IF B/G/L

Δ indicates that static electricity may destroy the component.

B/G/L/I 3390452 (Accessories)

Small bag with components to extend Tuner & IF B/G/L to system I.

D20 8300058 209 1N 4148

R9 5011441 470Ω 5% 1/8W

BP3 8030033 Cer filter 6MHz

SW2 8030159 Filter J 3251

B/G/D/K 3390453 (Accessories)

Small bag with components to modify Tuner & IF B/G/L to system B/G/D/K.

TR26 8320512 20 BC 338-25

D19 8300058 209 1N 4148

D20 8300058 209 1N 4148

D27 8300212 209 1N 4448

R158 5011358 560Ω 5% 1/8W

R165 5010937 47kΩ 5% 1/8W

R172 5010816 1kΩ 5% 1/8W

BP6 8030173 Filter 6.5MHz

SW1 8030241 Filter K 3255

PCB 2, 8007629 Pal/Secam Decoder

IC1 8341726 136 TDA 4650

IC3Δ 8341728 136 TDA 4661

IC4 8341725 136 TDA 3505

IC5 8341193 136 TDA 8444

TR1 8320747 51 BC 848C

TR2- 8320679 20 BC 548C

TR4

TR5 8320747 51 BC 848C

TR6 8320679 20 BC 548C

TR7 8320509 20 BC 548B

TR11 8320679 20 BC 548C

TR12 8320747 51 BC 848C

TR15- 8320747 51 BC 848C

TR16

TR22- 8320778 51 BC 858C

TR23

TR25- 8320747 51 BC 848C

TR27

TR29 8320778 51 BC 858C

TR30- 8320747 51 BC 848C

TR31

TR35 8320595 20 BC 337-40

TR36 8320747 51 BC 848C

D1 8300482 250 LL 4148

D2- 8300058 209 1N 4148

D4

D5 8300779 214 1N 4531

D10- 8300482 250 LL 4148

D14

D17- 8300779 214 1N 4531

D18

D25 8300296 209 ZPD5.6V 0.4W

D27 8300723 250 ZPD8.2V 0.5W

D30 8300779 214 1N 4531

D32- 8300482 250 LL 4148

D34

D35 8300605 250 ZPD10V 0.5W

D37- 8300482 250 LL 4148

D40

R65 5370402 2.2kΩ 30% 0.3W

R93 5011570 200Ω 1% 1/8W

R100 5021248 11.8kΩ 1% 1/8W

R101 5020542 22.1kΩ 1% 1/4W

R102 5011600 100kΩ 1% 1/8W

R105 5011839 180kΩ 1% 1/8W

R106 5021317 2.61kΩ 1% 1/8W

R107 5011814 49.9kΩ 1% 1/8W

R108 5021346 226kΩ 1% 1/8W

R110 5021345 8.25kΩ 1% 1/8W

R111 5021344 22kΩ 1% 1/8W

R116 5021342 100kΩ 1% 1/8W

17	20	32	34	35	40	43	50
66	103	136	146	209	212	214	217
218	221	250					

Resistors not referred to are standard, see page 3-20

C1	4200784	22μF 20% 16V	C58	4010106	10nF -20+80% 40V
C2	4200525	22μF 20% 10V	C59	4000275	15pF 5% 50V
C3	4000284	330pF 5% 50V	C60	4000229	150pF 5% 50V
C4	4100232	100pF 5% 63V	C61	4000226	68pF 5% 63V
C5	4100210	1.5nF 5% 63V	C62	4000229	150pF 5% 50V
C6-	4100236	1nF 5% 63V	C63	4000275	15pF 5% 50V
C7			C64-	4010166	100nF -20+80% 50V
C8	4010166	100nF -20+80% 50V	C65		
C10	4000240	56pF 5% 50V	C66-	4000233	220pF 5% 50V
C11	4000281	82pF 5% 50V	C67		
C12	4000276	18pF 5% 50V	C68	4000240	56pF 5% 50V
C13	4000278	27pF 5% 50V	C73-	4010220	100nF 10% 50V
C14	4000280	68pF 5% 50V	C74		
C15-	4000241	100pF 5% 50V	C75	4000241	100pF 5% 50V
C20			C77	4000241	100pF 5% 50V
C21	4010166	100nF -20+80% 50V	C79	4010157	10nF 10% 50V
C23	4010166	100nF -20+80% 50V	C80	4010166	100nF -20+80% 50V
C24	4000154	39pF 5% 63V	C81	4000290	22nF 10% 50V
C32	4000233	220pF 5% 50V	C82	4200403	100μF -20+50% 25V
C33	4010106	10nF -20+80% 40V	C92-	4000290	22nF 10% 50V
C36	4000239	33pF 5% 50V	C97		
C37	4000284	330pF 5% 50V	C98	4010166	100nF -20+80% 50V
C38-	4000345	1nF 5% 50V	C99-	4010209	47nF 10% 50V
C39			C100		
C40	4000344	560pF 5% 50V	C101	4200403	100μF -20+50% 25V
C41	4010155	220pF 10% 50V	C104-	4010157	10nF 10% 50V
C42	4130236	330nF 20% 63V	C105		
C44-	4000276	18pF 5% 50V	C108	4010209	47nF 10% 50V
C45			C109	4200544	22μF 20% 16V
C46	4340034	7.5-50pF	C111	4200517	2.2μF 20% 50V
C47	4000278	27pF 5% 50V	C112-	4200510	10μF 20% 16V
C48	4340034	7.5-50pF	C113		
C49	4000278	27pF 5% 50V	C114	4200508	22μF 20% 25V
C50	4130236	330nF 20% 63V	C115	4010157	10nF 10% 50V
C51	4010209	47nF 10% 50V	C122	4000326	680pF 5% 50V
C52	4010166	100nF -20+80% 50V	C123	4000344	560pF 5% 50V
C53-	4000290	22nF 10% 50V	C124	4000326	680pF 5% 50V
C54			C125	4010172	3.3nF 10% 50V
C55	4000345	1nF 5% 50V	C126	4000287	220nF -20+80% 25V
C56	4010106	10nF -20+80% 40V	C130	4200403	100μF -20+50% 25V
C57	4200600-	470μF 20% 16V			

L1	8020751	Coil 4.43MHz	L15	8020608	Coil 10μH 5%
L2	8020649	Coil 3.9μH 5%	L21	8020649	Coil 3.9μH 5%
L6	8020608	Coil 10μH 5%	L22	8020741	Coil 5.5MHz
L7-	8020730	Coil 22μH 10%	L25	8020749	Coil 10μH
L14			L35	8020916	Coil 47μH

X1	8090140	Crystal 7.15909MHz
X2	8090005	Crystal 8.8672MHz

P26	7220715	Plug 8/8 pole	P30	7220715	Plug 8/8 pole
P27	7220711	Plug 4/4 pole	P31	7220709	Plug 2/2 pole
P28	7220713	Plug 6/6 pole	P35	7220710	Plug 3/3 pole
P29	7220714	Plug 7/7 pole			

PCB 3, 8007669 Video Output

TR1- TR3	8320961	17	BF 421	TR4- TR6	8320962	43	BF 871
D1- D4	8300409	214	BAV 20	D14- D18	8300058	209	1N 4148
D5- D7	8300058	209	1N 4148	D19- D21	8300482	250	LL 4148
D8- D13	8300482	250	LL 4148				
R1- R3	5020127	10k Ω	5% 1W	R18	5020345	47 Ω	10% 0.3W
R10- R12	5011034	2.2k Ω	10% 1/2W	R19	5010806	1.2k Ω	5% 1/3W
				R20	5390004	Focus potentiometer	
C4	4130098	100nF	20% 400V	C6	4200515	4.7 μ F	20% 25V
C5	4010211	2.2nF	+100-0% 2kV				
L1	8020590	Coil	270 μ H				
S1	7400038	Switch					
P1	7200062	Socket picture tube		P90	7220715	Plug 8/8 pole	
P89	7220427	Plug 5/5 pole		P91	7500152	Contact pin	

PCB 4, 8007519 Power Supply & Deflection

IC1- IC3	8330234	136	CNY 17-2ZW	IC5	8340569	103	LM 358
IC4	8340794 2816195	146	TDA 8172 Spring clip				
TR1	8320850	35	BUT 12F Spring clip	TR14	8320509	20	BC 548B
TR2	8320595	20	BC 337-40	TR15	8320510	20	BC 558B
TR3- TR4	8320503	20	BC 557B	TR16	8320503	20	BC 557B
TR5	8320497	20	BC 547B	TR17	8320497	20	BC 547B
TR6	8320503	20	BC 557B	TR18- TR19	8320509	20	BC 548B
TR7- TR8	8320497	20	BC 547B	TR20 Δ	8320853	66	IRF 624
TR9	8320503	20	BC 557B	TR31 Δ	8320922	50	VN 2010L
TR10	8320626	17	BC 368	TR33	8320964	34	BU 2508AF
TR11	8320503	20	BC 557B		2816154		Spring clip
TR12	8320429	32	BD 435		6710008		Ferrite core
TR13	8320497	20	BC 547B	TR34	8320497	20	BC 547B
				TR35 Δ	8320853	66	IRF 624
D1- D4	8300302	212	1N 5407	D31	8300649	221	1N 5060
D5- D6	8300675	217	BYV 26B	D32	8300671	209	RGP 10B
	6710008		Ferrite core	D33	8300388	214	RGP 30P
D7	8300670	221	BYV 26D	D34	8300776	40	BYW 29F
D8	8300779	218	1N 4531		2816195		Spring clip
D9- D12	8300671	209	RGP 10B		6710008		Ferrite core
D15- D18	8300779	218	1N 4531	D35	8300671	209	RGP 10B
D30	8300784	221	BYW 96D	D36	8300776	40	BYW 29F
					2816195		Spring clip
					6710008		Ferrite core
				D37	8300779	218	1N 4531
				D38	8300310	209	ZPD 10V 0.4W



Δ indicates that static electricity may destroy the component

51 	102 	103 	124 	136 	207 	209 	214
217 	218 	221 	224 	250 			

Resistors not referred to are standard, see page 3-20

D40-	8300779	218	1N 4531	D78	8300779	218	1N 4531
D41				D80-	8300518	217	BA 157
D42	8300596	209	ZPD 6.2V 0.4W	D81			
D50	8300310	209	ZPD 10V 0.4W	D82	8300023	209	1N 4002
D51	8300779	218	1N 4531	D83	8300304	221	BY 228
D52	8300201	209	ZPD 6.2V 0.4W	D84	8300784	221	BYW 96D
D60	8300518	217	BA 157	D90-	8300388	214	RGP 30P
D70	8300779	218	1N 4531	D91			
D71	8300310	209	ZPD 10V 0.4W	D93	8300388	214	RGP 30P
D75-	8300779	218	1N 4531	D100	8300388	214	RGP 30P
D76				D109	8300023	209	1N 4002
D77	8300518	217	BA 157				

ST1	8300320	207	BTB 06
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R2	5230009	PTC 40+1000Ω 265V	R68	5020183	464Ω 1% 1/4W
R5	5020837	1.5kΩ 5% 1W	R70	5020940	348kΩ 1% 1/4W
R10	5011209	10MΩ 5%	R71	5020234	14.7kΩ 1% 1/4W
R37	5020803	3.3Ω 5% 2W	R72	5370402	2.2kΩ 30% 0.3W
R38	5012074	0.47Ω 5% 1/4W	R123	5021348	866Ω 1% 1/8W
R55	5020714	0.1Ω 10% 0.4W	R127	5021300	0.22Ω 5% 1/4W
R57	5020697	22kΩ 5% 1W	R142	5021299	0.47Ω 5% 1/4W
R64	5020367	499Ω 1% 1/4W			
C1	4130505	100nF 20% 250V	C44	4200600	470μF 20% 16V
C2	4130098	100nF 20% 400V	C46	4200610	470μF 20% 63V
C3-	4130169	47nF 20% 250V	C47	4010105	1nF 10% 50V
C4			C48	4200612	1000μF -20+50% 25V
C5-	4010240	2.2nF 20% 400V	C49-	4010105	1nF 10% 50V
C6			C51		
C7-	4010092	220pF 10% 500V	C52	4200689	2200μF 20% 10V
C8			C53	4200612	1000μF -20+50% 25V
C9	4201114	150μF 20% 385V	C56	4130230	100nF 20% 63V
C10-	4010104	220pF 10% 500V	C58	4000153	33pF 5% 50V
C11			C61	4200517	2.2μF 20% 50V
C12	4130474	6.8nF 20% 630V	C62	4130230	100nF 20% 63V
C13	4010230	220pF 20% 1kV	C70	4130308	220nF 10% 63V
C14	4200525	22μF 20% 10V	C71	4130499	15nF 20% 400V
C15	4010106	10nF -20+80% 40V	C72	4010123	1nF 10% 500V
C17	4010105	1nF 10% 50V	C73	4130230	100nF 20% 63V
C18	4010118	330pF 10% 50V	C80	4130503	470nF 20% 100V
C19	4010107	22nF -20+80% 40V	C81	4130502	15nF 10% 250V
C20-	4010103	2.2nF 10% 50V	C90	4010103	2.2nF 10% 50V
C23			C91	4010101	4.7nF 10% 50V
C24	4100209	470pF 5% 63V	C92	4010104	220pF 10% 500V
C26	4100235	680pF 5% 63V	C100	4200760	220μF -20+50% 16V
C29	4200917	100μF -20+50% 40V	C101	4130495	2.2nF 5% 1500V
C30	4010101	4.7nF 10% 50V	C102	4130323	6.8nF 5% 1500V
C31	4200952	47μF 25V	C103	4130325	18nF 5% 630V
C32	4200512	1μF 20% 50V	C104	4130349	300nF 5% 250V
C34-	4010106	10nF -20+80% 40V	C105	4130326	560nF 5% 250V
C35			C106	4010123	1nF 10% 500V
C39	4010243	2.2nF 10% 500V	C120-	4200600	470μF 20% 16V
C40-	4010104	220pF 10% 500V	C121		
C41			C129	4010123	1nF 10% 500V
C42	4201113	100μF -20+50% 250V	C130	4200512	1μF 20% 50V
C43	4010105	1nF 10% 50V	C131	4200600	470μF 20% 16V



C132	4201082	100µF -20+50% 40V	C137-	4200525	22µF 20% 10V
C133	4130233	220nF 20% 63V	C138		
C134	4200600	470µF 20% 16V			
C135-	4130233	220nF 20% 63V			
C136					

L1	6850209	Coil 0.5µH	L6	8020325	Coil 10µH
L2	6850218	Coil 0.3µH	L7	8024052	Coil 260µH 1.5A
L3	8024045	Coil	L8	8020900	Coil 4.5mH-38µH
L4	8020901	Coil 10mH	L10	8020708	Coil 15µH
L5	6850195	Coil 1.3µH			

FE1-	6710023	Ferrite core
FE2		

F1	6600121	Fuse 3.15AT
	7500223	Holder

T1	8014113	Transformer EHT	T4	8014115	Transformer
T2	8014112	Transformer SMPS	T6	8022328	Mains filter
T3	8014074	Transformer			

CP1-	7500013	Contact pin
CP3		

P11	7220712	Plug 5/5 pole	P18	7220717	Plug 10/10 pole
P12	7220710	Plug 3/3 pole	P20	7220406	Plug 2/2 pole
P13	7220711	Plug 4/4 pole	P21	7220976	Plug 2/2 pole
P14	7220427	Plug 5/5 pole	P22	7220429	Plug 7/7 pole
P15	7220717	Plug 10/10 pole	P23	7220428	Plug 6/6 pole
P16	7220712	Plug 5/5 pole	P24	7220709	Plug 2/2 pole
P17	7220424	Plug 2/2 pole			

PCB 6, 8007409
Microcomputer 64K

IC1Δ	8341463	136	6264 8KX8	IC6Δ	8341125	136	2816B
IC2Δ	8341034	124	80C32	IC7Δ	8341748	103	TL 7705B
IC3Δ*	8341421	136	27C512-20	IC8Δ	8340373	136	4001B
	7200056		Socket f/IC3	IC9Δ	8341537	136	74HC138
IC4Δ	8341322	124	82C55A	IC11Δ	8340167	102	HEF 4001UB
IC5Δ	8341046	136	74HC573	IC12Δ	8340245	102	4011B

TR2-	8320616	51	BC 858B	TR26-	8320615	51	BC 848B
TR3				TR28			
TR5-	8320616	51	BC 858B	TR30	8320747	51	BC 848C
TR7				TR31-	8320755	51	BC 847B
TR8	8320615	51	BC 848B	TR32			
TR9	8320740	51	BF 840	TR33	8320616	51	BC 858B
TR10	8320616	51	BC 858B	TR34-	8320615	51	BC 848B
TR11-	8320615	51	BC 848B	TR36			
TR12				TR37	8320755	51	BC 847B
TR13	8320616	51	BC 858B	TR38-	8320615	51	BC 848B
TR23	8320755	51	BC 847B	TR40			
TR24	8320615	51	BC 848B				

D2-	8300520	224	ZPD6.8V 0.5W	D19	8300482	250	LL 4148
D3				D24-	8300482	250	LL 4148
D4-	8300482	250	LL 4148	D26			
D7				D27	8300520	224	ZPD6.8V 0.5W
D17	8300482	250	LL 4148	D28-	8300482	250	LL 4148
D18	8300520	224	ZPD6.8V 0.5W	D39			

Δ indicates that static electricity may destroy the component.

22	35	51	101	102	103	124	136
147	209	221	250				

Resistors not referred to are standard, see page 3-20

C3-	4010166	100nF -20+80% 50V	C64	4010170	2.2nF 10% 50V
C9			C68-	4010170	2.2nF 10% 50V
C10	4010170	2.2nF 10% 50V	C70		
C17-	4010170	2.2nF 10% 50V	C71	4010157	10nF 10% 50V
C18			C72-	4010170	2.2nF 10% 50V
C19	4010157	10nF 10% 50V	C73		
C20	4010170	2.2nF 10% 50V	C77-	4010170	2.2nF 10% 50V
C23-	4010170	2.2nF 10% 50V	C78		
C26			C79	4000287	220nF -20+80% 25V
C28-	4010170	2.2nF 10% 50V	C80	4200431	10μF 20% 16V
C30			C81	4000286	470pF 5% 50V
C31	4000292	100pF 5% 50V	C84	4000286	470pF 5% 50V
C32	4000286	470pF 5% 50V	C85-	4010173	4.7nF 10% 50V
C33	4130313	470nF 20% 63V	C86		
C34	4010170	2.2nF 10% 50V	C87-	4000278	27pF 5% 50V
C36	4000293	47pF 5% 50V	C88		
C37	4010170	2.2nF 10% 50V	C89	4000287	220nF -20+80% 25V
C39	4000293	47pF 5% 50V	C90-	4000292	100pF 5% 50V
C40	4000287	220nF -20+80% 25V	C92		
C41	4130315	15nF 5% 63V	C93	4000233	220pF 5% 50V
C46	4000286	470pF 5% 50V	C94	4000292	100pF 5% 50V
C49	4010166	100nF -20+80% 50V	C95-	4000286	470pF 5% 50V
C52	4010157	10nF 10% 50V	C96		
C53	4000287	220nF -20+80% 25V	C97	4000293	47pF 5% 50V
C56	4010177	22nF -20+80% 50V	C98-	4010166	100nF -20+80% 50V
C57	4000239	33pF 5% 50V	C99		
C58	4000233	220pF 5% 50V	C100	4000286	470pF 5% 50V
C59	4000286	470pF 5% 50V			

L1-	8020552	Coil 10μH 10%	L8	8020807	Coil 10μH 10%
L2					
L4-	8020552	Coil 10μH 10%			
L7					

BP1	8030056	Cer filter 455kHz ±1kHz
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X1	8090075	Crystal 12MHz
X2	8030024	Resonator 455kHz ±1kHz

P70	7220709	Plug 2/2 pole	P73	7220713	Plug 6/6 pole
P71	7220718	Plug 11/11 pole	P74	7220714	Plug 7/7 pole
P72	7220710	Plug 3/3 pole	P75	7220715	Plug 8/8 pole

R1-	5020460	220Ω 5% 1W
R2		

C1-	4010106	10nF -20+80% 40V
C2		

S1-	7400318	Switch 1 pole
S2		

PCB 7, 8007609
Headphone



PCB 8, Nicam
8007066 for Pal B/G
8007071 for Pal I

P86 7220429 Plug 7/7 pole
P98 7210742 Socket headphone 3.5mm

IC1	8341099	136	TA 8662N	IC5Δ	8341257	102	74HC4052
IC2	8341159	124	CF 70123	IC6	8341225	103	LM 3578
IC3	8341173	101	PCF 8574	IC7Δ	8341022	103	4558
IC4	8341724	147	SAA 7322				

TR1-	8320615	51	BC 848B	TR8-	8320609	51	BC 808-25
TR2				TR9			
TR3	8320830	22	BF 256A	TR10	8320615	51	BC 848B
TR7	8320439	35	BD 535				

D1	8300656	209	BB 809	D100	8300482	250	LL 4148
D2	8300345	221	BYV 95C	D101	8300677	250	ZPD 4.7V 0.5W
D6-	8300482	250	LL 4148	D102	8300482	250	LL 4148
D7				D103	8300605	250	ZPD 10V

R31	5011527	12kΩ 1% 1/8W	R46-	5011600	100kΩ 1% 1/8W
R32	5011600	100kΩ 1% 1/8W	R47		
R33-	5011527	12kΩ 1% 1/8W	R53	5020759	0.27Ω 5% 1/4W
R35			R100-	5012163	560kΩ 1% 1/8W
R36	5011600	100kΩ 1% 1/8W	R101		
R39-	5012162	2.2kΩ 1% 1/8W	R102-	5012164	1MΩ 1% 1/8W
R40			R103		
R41-	5012161	3.9kΩ 1% 1/8W			
R42					

C1	4010166	100nF -20+80% 50V	C46-	4200826	10μF 20% 16V
C3	4010166	100nF -20+80% 50V	C49		
C4	4010157	10nF 10% 50V	C50	4000345	1nF 5% 50V
C6	4010176	10nF -20+80% 50V	C51	4000233	220pF 5% 50V
C7	4000240	56pF 5% 50V	C52	4200760	220μF -20+50% 16V
C8-	4000277	22pF 5% 50V	C53	4200561	10μF 20% 50V
C9			C55	4000241	100pF 5% 50V
C11	4010176	10nF -20+80% 50V	C56-	4130228	470nF 20% 63V
C12-	4000282	180pF 5% 50V	C59		
C13			C60	4010166	100nF -20+80% 50V
C15-	4010220	100nF 10% 50V	C62	4010166	100nF -20+80% 50V
C20			C63	4000275	15pF 5% 50V
C21-	4010176	10nF -20+80% 50V	C100	4200826	10μF 20% 16V
C23			C112	4010220	100nF 10% 50V
C25	4010176	10nF -20+80% 50V	C115	4010220	100nF 10% 50V
C27	4000281	82pF 5% 50V	C116	4000234	47pF 5% 50V
C29	4000345	1nF 5% 50V	C117	4010220	100nF 10% 50V
C30	4010220	100nF 10% 50V	C118-	4000277	22pF 5% 50V
C31	4000278	27pF 5% 50V	C119		
C32	4000277	22pF 5% 50V	C120-	4000234	47pF 5% 50V
C34	4340034	7.5-50pF	C123		
C35	4000286	470pF 5% 50V	C124	4000345	1nF 5% 50V
C37	4010195	2.7nF 5% 50V	C125	4000234	47pF 5% 50V
C38	4000241	100pF 5% 50V	C126-	4000345	1nF 5% 50V
C39	4010220	100nF 10% 50V	C130		
C40	4000286	470pF 5% 50V	C131-	4000236	470pF 10% 50V
C41	4000241	100pF 5% 50V	C132		
C42	4010195	2.7nF 5% 50V			
C43	4000277	22pF 5% 50V			
C44	4010220	100nF 10% 50V			

L1-	8020747	Coil 1mH 10%	L6	8020759	Coil 1mH 10%
L2			L7	8020609	Coil 3.3μH 20%
L4-	8020609	Coil 3.3μH 20%	L20	8020672	Coil 33μH 10%
L5			L30	8020609	Coil 3.3μH 20%

BP1 8020853 Coil 5.85MHz for Pal B/G
8020735 Coil 6.552MHz for Pal I

Δ indicates that static electricity may destroy the component.

17	20	51	67	136	143	209	214
222	244	245	250				

Resistors not referred to are standard, see page 3-20

X1	8090085	Crystal 5.85MHz for Pal B/G
	8090081	Crystal 6.552MHz for Pal I
X2	8090082	Crystal 16.384MHz
X3	8090083	Crystal 5.824MHz

P801	7220710	Plug 3/3 pole	P803	7220712	Plug 5/5 pole
P802	7220711	Plug 4/4 pole	P804	7220713	Plug 6/6 pole

PCB 9, 8007789 IR Transceiver

TR1	8320740	17	BF 840	TR6	8320616	51	BC 858B
TR2	8320636	51	BC 849B	TR7	8320615	51	BC 848B
TR4	8320616	51	BC 858B	TR9	8320691	17	BC 369
TR5	8320691	17	BC 369				
D3-	8330145	244	IR detector	D8	8330236	222	LED bi-colour
D4			455kHz		3152809		Holder f/D8
D5-	8330237	245	IR diode	D9	8330237	245	IR diode
D7							
R10	5011281	0.82Ω	5% 1/4W	R17	5210009	(LDR)	28kΩ
R12	5011281	0.82Ω	5% 1/4W				(50LUX)
C1-	4000286	470pF	5% 50V	C5-	4201120	220μF	-20+50% 10V
C2				C6			
C3	4000234	47pF	5% 50V	C8-	4010166	100nF	-20+80% 50V
C4	4000287	220nF	-20+80% 25V	C10			
L1	8020910	Coil	220μH	L3	8020608	Coil	10μH 5%
L2	8020768	Coil	455kHz				
P85	7220716	Plug	9/9 pole				

PCB 10, 8007569 Sound Output

IC2-	8341236	143	TDA 2040
IC3	2622448		Mica washer
	2816195		Spring clip
IC4Δ	8320946	67	IRF Z22
D1-	8300779	214	1N 4531
D3			
R12	5020110	10kΩ	1% 1/4W
R21	5020229	9.53kΩ	1% 1/4W

Δ indicates that static electricity may destroy the component.

C1	4130234	470nF 10% 63V	C13	4200600	470µF 20% 16V
C3	4010027	1nF 10% 50V	C14-	4130233	220nF 20% 63V
C4	4200617	47µF 20% 10V	C15		
C5	4200600	470µF 20% 16V	C17-	4201115	3300µF -20+50% 40V
C6	4130234	470nF 10% 63V	C18		
C8-	4130233	220nF 20% 63V	C19	4201143	10µF 20% 25V
C9			C20	4200516	47µF 20% 16V
C11	4010027	1nF 10% 50V	C21-	4130236	330nF 20% 63V
C12	4200617	47µF 20% 10V	C22		

L1- 6850114 Coil 0.5µH
L2

P46 7220711 Plug 4/4 pole P48 7220424 Plug 2/2 pole
P47 7220427 Plug 5/5 pole

PCB 12, 8007899 Pal Decoder

IC2 8341531 136 TDA 4510 IC4 8341725 136 TDA 3505
IC3Δ 8341728 136 TDA 4661 IC5 8341193 136 TDA 8444

TR1	8320747	51	BC 848C	TR25-	8320747	51	BC 848C
TR2	8320679	20	BC 548C	TR27			
TR5	8320747	51	BC 848C	TR29	8320778	51	BC 858C
TR7	8320509	20	BC 548B	TR30-	8320747	51	BC 848C
TR11	8320679	20	BC 548C	TR31			
TR12	8320747	51	BC 848C	TR35	8320595	20	BC 337-40
TR22-	8320778	51	BC 858C	TR36	8320747	51	BC 848C
TR23							

D1	8300482	250	LL 4148	D35	8300605	250	ZPD 10V
D25	8300128	209	ZPD 5.6V 0.4W	D37-	8300482	250	LL 4148
D27	8300723	250	ZPD 8.2V	D40			
D30	8300779	214	1N 4531				
D32-	8300482	250	LL 4148				
D34							

R60	5011914	5.1kΩ 1% 1/8W	R107	5011814	49.9kΩ 1% 1/8W
R93	5011570	200Ω 1% 1/8W	R108	5021346	226kΩ 1% 1/8W
R100	5021248	11.8kΩ 1% 1/8W	R110	5021345	8.25kΩ 1% 1/8W
R101	5020542	22.1kΩ 1% 1/4W	R111	5021344	22kΩ 1% 1/8W
R102	5011600	100kΩ 1% 1/8W	R116	5021342	100kΩ 1% 1/8W
R105	5011839	180kΩ 1% 1/8W	R157	5011378	0.82Ω 5% 1/4W
R106	5021317	2.61kΩ 1% 1/8W			

C1	4200784	22µF 20% 16V	C51	4010209	47nF 10% 50V
C2	4200525	22µF 20% 10V	C53	4000290	22nF 10% 50V
C3	4000284	330pF 5% 50V	C56	4010106	10nF -20+80% 40V
C5	4100210	1.5nF 5% 63V	C57	4200600	470µF 20% 16V
C8	4010166	100nF -20+80% 50V	C58	4010106	10nF -20+80% 40V
C10	4000240	56pF 5% 50V	C73-	4010220	100nF 10% 50V
C11	4000281	82pF 5% 50V	C74		
C12	4000276	18pF 5% 50V	C75	4000241	100pF 5% 50V
C13	4000278	27pF 5% 50V	C77	4000241	100pF 5% 50V
C14	4000280	68pF 5% 50V	C79	4010157	10nF 10% 50V
C15-	4000241	100pF 5% 50V	C80	4010166	100nF -20+80% 50V
C20			C81	4000290	22nF 10% 50V
C21	4010166	100nF -20+80% 50V	C82	4200403	100µF -20+50% 25V
C23	4010166	100nF -20+80% 50V	C92-	4000290	22nF 10% 50V
C24	4000154	39pF 5% 63V	C97		
C36	4000239	33pF 5% 50V	C98	4010166	100nF -20+80% 50V
C37	4000284	330pF 5% 50V	C99-	4010209	47nF 10% 50V
C41	4010155	220pF 10% 50V	C100		
C42	4130236	330nF 20% 63V	C101	4200403	100µF -20+50% 25V
C44	4000276	18pF 5% 50V	C104-	4010157	10nF 10% 50V
C48	4340034	7.5-50pF	C105		
C49	4000278	27pF 5% 50V	C108	4010209	47nF 10% 50V
C50	4130236	330nF 20% 63V	C109	4200544	22µF 20% 16V

Δ indicates that static electricity may destroy the component.

20	51	101	103	125	136	138	209
214	250						

Resistors not referred to are standard, see page 3-20

C111	4200517	2.2 μ F 20% 50V	C123	4000344	560pF 5% 50V
C112-	4200510	10 μ F 20% 16V	C124	4000326	680pF 5% 50V
C113			C125	4010172	3.3nF 10% 50V
C114	4200508	22 μ F 20% 25V	C126	4000287	220nF -20+80% 25V
C115	4010157	10nF 10% 50V	C130	4200403	100 μ F -20+50% 25V
C122	4000326	680pF 5% 50V			

L1	8020751	Coil 4.43MHz	L15	8020608	Coil 10 μ H 5%
L6	8020608	Coil 10 μ H 5%	L21	8020649	Coil 3.9 μ H 5%
L7-	8020730	Coil 22 μ H 10%	L35	8020916	Coil 47 μ H 450mA
L14					

X2	8090005	Crystal 8.8672MHz
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P26	7220715	Plug 8/8 pole	P30	7220715	Plug 8/8 pole
P27	7220711	Plug 4/4 pole	P31	7220709	Plug 2/2 pole
P28	7220713	Plug 6/6 pole	P35	7220710	Plug 3/3 pole
P29	7220714	Plug 7/7 pole			

PCB 13, 8007579

Sync Processing

IC1	8341131	136	TDA 2579A
IC2	8341359	136	TDA 8432
IC5 Δ	8340176	136	HEF 4013

TR1	8320510	20	BC 558B	TR7	8320510	20	BC 558B
TR2	8320509	20	BC 548B	TR8	8320509	20	BC 548B
TR3-	8320595	20	BC 337-40	TR9-	8320510	20	BC 558B
TR4				TR10			
TR5	8320509	20	BC 548B	TR11	8320509	20	BC 548B

D1-	8300779	214	1N 4531	D6-	8300779	214	1N 4531
D3				D9			
D4	8300201	209	ZPD 6.2V 0.4W	D12	8300779	214	1N 4531
D5	8300169	209	ZPD 5.1V 0.5W	D14	8300779	214	1N 4531

R22	5011745	33k Ω 1% 1/4W
R29	5011744	24k Ω 1% 1/4W
R38	5020114	11k Ω 1% 1/4W
R96	5011378	0.82 Ω 5% 1/4W

C1	4200512	1 μ F 20% 50V	C12	4100289	2.7nF 1% 63V
C2	4010106	10nF -20+80% 40V	C13	4130230	100nF 20% 63V
C3-	4130230	100nF 20% 63V	C14	4010105	1nF 10% 50V
C5			C15	4130303	15nF 10% 63V
C6	4130313	470nF 20% 63V	C16	4010106	10nF -20+80% 40V
C7	4200544	22 μ F 20% 16V	C19	4130307	150nF 10% 63V
C8	4200517	2.2 μ F 20% 50V	C20	4130313	470nF 20% 63V
C9	4200616	6.8 μ F 20% 25V	C21	4010106	10nF -20+80% 40V
C10	4130230	100nF 20% 63V	C22	4130233	220nF 20% 63V

Δ indicates that static electricity may destroy the component.

PCB 14, 8007479 Double AV Switch

C27	4000137	47pF 5% 63V	C51	4130235	47nF 20% 63V
C40	4200510	10pF 20% 16V	C52	4010243	2.2nF 10% 500V
C41	4200688	47pF 20% 50V	C53	4010105	1nF 10% 50V
C42	4000204	100pF 5% 63V	C54	4200524	10pF 20% 25V
C45	4200512	1pF 20% 50V	C55-	4000136	22pF 5% 63V
C46	4010106	10nF -20+80% 40V	C56		
C50	4200523	0.47pF 20% 50V			

L2 8020916 Coil 47pH 450mA

P36	7220717	Plug 10/10 pole	P38	7220710	Plug 3/3 pole
P37	7220714	Plug 7/7 pole			

IC1	8341037	125	TDA 8421	IC10Δ	8341059	101	4052
IC2Δ-	8341059	101	4052	IC11Δ-	8341022	103	4558
IC5Δ				IC14Δ			
IC6	8341167	136	TEA 5115	IC16Δ-	8341022	103	4558
IC8Δ	8341025	138	4094	IC17Δ			
IC9	8341795	136	TEA 6416				

TR1	8320523	20	BC 328-25	TR13	8320755	51	BC 847B
TR2-	8320512	20	BC 338-25	TR14	8320616	51	BC 858B
TR5				TR15	8320755	51	BC 847B
TR6	8320509	20	BC 548B	TR16-	8320936	51	BC 847C
TR7	8320936	51	BC 847C	TR17			
TR8	8320497	20	BC 547B	TR18	8320503	20	BC 557B
TR9	8320936	51	BC 847C	TR19	8320497	20	BC 547B
TR10	8320616	51	BC 858B	TR20-	8320811	51	BC 857B
TR11	8320552	20	BC 327-25	TR21			
TR12	8320503	20	BC 557B	TR22	8320936	51	BC 847C

D2-	8300644	250	ZPD6.2V 0.5W	D15	8300478	209	BA 483
D3				D18	8300482	250	LL 4148
D4	8300779	209	1N 4531	D19	8300779	209	1N 4531
D5	8300482	250	LL 4148	D20-	8300635	250	BA 683
D6	8300029	209	ZPD12V 0.4W	D29			
D8	8300779	209	1N 4531	D30	8300482	250	LL 4148
D11	8300023	209	1N 4002	D31	8300779	209	1N 4531
D13	8300326	209	ZPD11V 0.4W				

R20	5021119	27Ω 5% 1W	R44	5021145	76.8Ω 1% 1/4W
R24	5020447	15Ω 5% 2W	R119	5020489	10Ω 10% 0.3W
R27	5021197	39Ω 5% 1W	R157-	5021145	76.8Ω 1% 1/4W
R32	5021197	39Ω 5% 1W	R160		
R40	5021145	76.8Ω 1% 1/4W			

C1-	4010175	33nF 10% 50V	C35	4130347	5.6nF 10% 63V
C2			C36-	4010166	100nF -20+80% 50V
C3	4010101	4.7nF 10% 50V	C40		
C4	4010173	4.7nF 10% 50V	C42	4130306	100nF 10% 63V
C7	4200628	100pF -20+50% 16V	C44	4130306	100nF 10% 63V
C10	4200525	22pF 20% 10V	C46-	4000287	220nF -20+80% 25V
C11-	4130313	470nF 20% 63V	C51		
C14			C53	4201143	10pF 20% 25V
C15-	4010166	100nF -20+80% 50V	C54-	4000284	330pF 5% 50V
C17			C57		
C18-	4000345	1nF 5% 50V	C58-	4000287	220nF -20+80% 25V
C19			C61		
C23	4000233	220pF 5% 50V	C62-	4000284	330pF 5% 50V
C26	4000233	220pF 5% 50V	C63		
C28-	4000233	220pF 5% 50V	C64-	4000287	220nF -20+80% 25V
C29			C65		
C30	4010166	100nF -20+80% 50V	C66-	4000284	330pF 5% 50V
C33	4000233	220pF 5% 50V	C67		
C34	4010166	100nF -20+80% 50V			

Δ indicates that static electricity may destroy the component.

20	51	53	105	209			

Resistors not referred to are standard, see page 3-20

C68-	4000287	220nF -20+80% 25V	C96-	4200515	4.7μF 20% 25V
C69			C100		
C70-	4010166	100nF -20+80% 50V	C101	4201143	10μF 20% 25V
C73			C102-	4200515	4.7μF 20% 25V
C74-	4000287	220nF -20+80% 25V	C103		
C75			C104	4200826	10μF 20% 16V
C76-	4200517	2.2μF 20% 50V	C105	4200510	10μF 20% 16V
C77			C107	4010166	100nF -20+80% 50V
C78	4010176	10nF -20+80% 50V	C109	4200510	10μF 20% 16V
C79	4000345	1nF 5% 50V	C110	4000287	220nF -20+80% 25V
C80-	4200516	47μF 20% 16V	C111-	4010166	100nF -20+80% 50V
C81			C112		
C82-	4010157	10nF 10% 50V	C122	4010166	100nF -20+80% 50V
C83			C124-	4010166	100nF -20+80% 50V
C84	4200617	47μF 20% 10V	C129		
C85-	4000287	220nF -20+80% 25V	C130	4200525	22μF 20% 10V
C87			C131	4010175	33nF 10% 50V
C88-	4200525	22μF 20% 10V	C132-	4010166	100nF -20+80% 50V
C89			C136		
C90	4200600	470μF 20% 16V	C139-	4200525	22μF 20% 10V
C91	4000233	220pF 5% 50V	C140		
C94-	4010166	100nF -20+80% 50V	C141	4000287	220nF -20+80% 25V
C95			C150	4000287	220nF -20+80% 25V

P18	3168760	Socket panel	P60	7220718	Plug 11/11 pole
P51	7220711	Plug 4/4 pole	P61	7220710	Plug 3/3 pole
P52	7220413	Plug 4/4 pole	P62	7220713	Plug 6/6 pole
P53	7220710	Plug 3/3 pole	P63	7220411	Plug 2/2 pole
P54	7220715	Plug 8/8 pole	P64	7220716	Plug 9/9 pole
P55	7220711	Plug 4/4 pole	P65	7220709	Plug 2/2 pole
P56	7220715	Plug 8/8 pole	P66	7220711	Plug 4/4 pole
P57	7220717	Plug 10/10 pole	P700	7220709	Plug 2/2 pole
P58	7220709	Plug 2/2 pole	P701	7220967	Plug 3/3 pole
P59	7220711	Plug 4/4 pole			

PCB 15, 8007739

St By Stabilization

IC1	8340212	105	78M05
	3358291		Heat sink

D1	8300556	209	ZPD 6.2V 1.3W
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C1	4200512	1μF 20% 50V
C2	4130230	100nF 20% 63V
C3	4200628	100μF -20+50% 16V
C4	4130230	100nF 20% 63V

L1	8020807	Coil 10μH 10%
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F1	6604036	Fuse 315mA 250V
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P49-	7220424	Plug 2/2 pole	P79	7220711	Plug 4/4 pole
P50			P81	7220709	Plug 2/2 pole
P76	7220426	Plug 4/4 pole	P82	7220716	Plug 9/9 pole
P77	7220715	Plug 8/8 pole	P83	7220429	Plug 7/7 pole
P78	7220714	Plug 7/7 pole	P84	7220427	Plug 5/5 pole

PCB 17, 8007679 Transposer Interface (Accessories)

TR1	8320510	20	BC 558B
TR2	8320509	20	BC 548B

D1	8300596	209	ZPD6.2V 0.4W
D2	8300036	209	ZPD4.7V 0.4W

R5	5020093	4.64k Ω 1% 1/4W
R6	5020219	5.36k Ω 1% 1/4W

C1	4200524	10 μ F 20% 25V
C2	4010103	2.2nF 10% 50V

P99	7220710	Plug 3/3 pole
P100	7210660	Headphone socket 3.5mm

PCB 29, 8003719 Transposer (Accessories)

TR1	8320670	51	BFT 25	TR4	8320615	51	BC 848B
TR2	8320615	51	BC 848B	TR5	8320672	51	BFS 20
TR3	8320754	53	BF 992				

D1-D4	8300478	209	BA 483
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C1-C7	4000342	1nF 10% 50V	C16	4000342	1nF 10% 50V
C8	4000337	1.8pF \pm 0.25pF 63V	C17	4000332	8.2pF \pm 0.5pF 50V
C9	4000276	18pF 5% 50V	C18	4000275	15pF 5% 50V
C10	4000229	150pF 5% 50V	C19	4000276	18pF 5% 50V
C11	4000278	27pF 5% 50V	C20	4000267	3pF \pm 0.25pF 50V
C12	4000331	6.8pF \pm 0.25pF 50V	C21	4000342	1nF 10% 50V
C13	4000274	12pF 5% 50V	C22	4000331	6.8pF \pm 0.25pF 50V
C14	4000330	5.6pF \pm 0.5pF 50V	C23	4000274	12pF 5% 50V
C15	4000337	1.8pF \pm 0.25pF 63V	C24	4000342	1nF 10% 50V

L1-L2	8020609	Coil 3.3 μ H	L5	6850175	Coil 52nH
L3	6850203	Coil 400nH	L6	6850174	Coil 860nH
L4	6850177	Coil 97nH	L7	6850202	Coil 235nH
			L8	6850179	Coil 58nH

7210589	Socket COAX, female	3164631	Cap, top
7220539	Socket COAX, male	3164635	Cap, bottom
		6270386	Wire w/plug

PCB 34, 8007617 Headphone MX 4000

R1-R2	5020460	220 Ω 5% 1W
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C1-C2	4010041	10nF -20+80% 40V
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P86	7220429	Plug 7/7 pole	P98	7210742	Socket headphone 3.5mm
P87	7220710	Plug 3/3 pole			

PCB 36, 8007617 Deflection Transformer

R3	5011000	10 Ω 5% 1/2W
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T1	8014111	Transformer
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S1-S2	7400318	Switch 1 pole
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P88	7220710	Plug 3/3 pole	P93	7220430	Plug 8/8 pole
P92	7220429	Plug 7/7 pole			

20	31	103	105	136	209	214	

Resistors not referred to are standard, see page 3-20

PCB 37, 8007509 Teletext

IC1	8340720	136	SAA 5231	IC3	8341463	136	6264
IC2	8341068	136	SAA 5243				
TR1-	8320509	20	BC 548B	TR7	8320595	20	BC 337-40
TR2				TR8	8320509	20	BC 548B
TR3	8320595	20	BC 337-40				
TR5-	8320509	20	BC 548B				
TR6							
D1	8300296	209	ZPD 5.6V 0.4W				
D2	8300779	214	1N 4531				
D5	8300779	214	1N 4531				
R11	5020591	6.8Ω 5% 2W		R45-	5011512	750Ω 1% 1/8W	
R39-	5020569	1.3kΩ 1% 1/4W		R47			
R41							
R42-	5011510	1kΩ 1% 1/8W					
R44							
C1	4200784	22μF 20% 16V		C13	4000139	100pF 5% 63V	
C3	4200511	100μF 20% 10V		C14	4200616	6.8μF 20% 25V	
C4	4200510	10μF 20% 16V		C15	4200512	1μF 20% 50V	
C5	4000165	220pF 5% 63V		C16	4000102	27pF 5% 63V	
C6	4130290	68nF 20% 63V		C17	4130230	100nF 20% 63V	
C7-	4000146	15pF 5% 63V		C18	4010106	10nF -20+80% 40V	
C8				C20-	4130230	100nF 20% 63V	
C9	4010105	1nF 10% 50V		C21			
C10	4010128	470pF 10% 50V		C26	4130308	220nF 10% 63V	
C11	4130193	22nF 20% 63V		C27	4130223	47nF 10% 63V	
C12	4010081	270pF 10% 50V		C28	4200512	1μF 20% 50V	
L1	8020565	Coil 2.2μH 10%					
L2	8020554	Coil 15μH 5%					
L3	8020565	Coil 2.2μH 10%					
L4	8020555	Coil 6MHz					
L5-	8020916	Coil 47μH 450mA					
L6							
X1	8090041	Crystal 13.875MHz					
P40	7220712	Plug 5/5 pole					
P41	7220713	Plug 6/6 pole					
P42	7220715	Plug 8/8 pole					
P43	7220710	Plug 3/3 pole					

PCB 38, 8007769 Tuner & IF Pal B/G

IC1	8341569	136	TDA 9820
IC2	8341794	136	TDA 8417
IC3	8341137	136	TDA 8120
IC4	8341142	136	TDA 8124
IC6Δ	8341158	136	PCF 8574P

IC7	8340212	105	78M05
IC9	8340569	103	LM 358
IC12	8341311	103	NE 567
IC13Δ	8340602	136	4052

TR1	8320509	20	BC 548B	TR18-	8320509	20	BC 548B
TR2	8320369	31	BD 534	TR19			
	3358267		Heat sink	TR22	8320510	20	BC 558B
			f/TR2	TR24-	8320509	20	BC 548B
TR3	8320509	20	BC 548B	TR25			
TR14	8320509	20	BC 548B	TR31-	8320509	20	BC 548B
TR17	8320510	20	BC 558B	TR32			

D1	8300803	214	ZPD 33V 0.4W	D15	8300478	209	BA 483
D2	8300596	209	ZPD 6.2V	D22-	8300779	214	1N 4531
D3	8300779	214	1N 4531	D23			
D5-	8300779	214	1N 4531	D26	8300404	209	ZPD 3.9V 0.4W
D6				D28	8300779	214	1N 4531

R17	5370370	4.7kΩ	30% 0.3W	R167	5370432	470Ω	30% 0.3W
R32	5021305	4.64kΩ	1% 1/8W	R196	5370403	22kΩ	30% 0.1W
R33	5021306	5.36kΩ	1% 1/8W	R204	5370403	22kΩ	30% 0.1W
R56	5370381	10kΩ	30% 0.1W	R225	5030037	2 x 5.6kΩ +	
R99	5370370	4.7kΩ	30% 0.3W			3 x 1kΩ	SIL
R151	5021304	27kΩ	1% 1/8W				

C3	4130313	470nF	20% 63V	C71	4130176	33nF	20% 63V
C4	4200628	100μF	-20+50% 16V	C72	4200517	2.2μF	20% 50V
C5	4200544	22μF	20% 16V	C73	4130230	100nF	20% 63V
C24-	4130230	100nF	20% 63V	C75	4130347	5.6nF	10% 63V
C25				C76	4130313	470nF	20% 63V
C26	4130233	220nF	20% 63V	C77	4130311	680nF	10% 63V
C27	4130230	100nF	20% 63V	C78	4010241	4.7nF	5% 50V
C28	4200628	100μF	-20+50% 16V	C85	4130230	100nF	20% 63V
C33	4200510	10μF	20% 16V	C88-	4130230	100nF	20% 63V
C36	4200544	22μF	20% 16V	C89			
C41	4200512	1μF	20% 50V	C90	4010105	1nF	10% 50V
C43	4010106	10nF	-20+80% 40V	C95	4130230	100nF	20% 63V
C44-	4200512	1μF	20% 50V	C96	4200510	10μF	20% 16V
C45				C99-	4200510	10μF	20% 16V
C46	4200510	10μF	20% 16V	C102			
C49	4000380	2.7pF	±0.25pF 50V	C103	4010106	10nF	-20+80% 40V
C50	4010105	1nF	10% 50V	C112	4000155	56pF	5% 63V
C51	4200512	1μF	20% 50V	C113-	4010106	10nF	-20+80% 40V
C52-	4010105	1nF	10% 50V	C114			
C53				C117	4130234	470nF	10% 63V
C56	4200512	1μF	20% 50V	C119	4130230	100nF	20% 63V
C69	4010105	1nF	10% 50V	C120	4000380	2.7pF	±0.25pF 50V
C70	4130193	22nF	20% 63V	C124	4130230	100nF	20% 63V
				C125	4010105	1nF	10% 50V

L2	8020595	Coil 6.8μH	10%	L13	8022250	Coil 4.7mH	5%
L7	8020650	Coil 470nH	5%	L14	8020807	Coil 10μH	10%
L9	8020738	Coil 38.9MHz		L15	8020729	Coil 6.8μH	5%
L10	8020595	Coil 6.8μH	10%	L16	8020600	Coil 1μH	10%
L11	8020739	Coil 38.9MHz					
L12	8020791	Coil 330nH-47pF	38.9MHz				

BP1-	8030029	Cer filter 5.74MHz	±50kHz
BP2			
BP4	8030021	Cer filter 5.5MHz	±75kHz
BP5	8030026	Cer filter 5.5MHz	±50kHz
BP7	8030218	Cer filter 5.5MHz	

Δ indicates that static electricity may destroy the component.



20	32	51	101	136	209	214	250

Resistors not referred to are standard, see page 3-20

SW2 8030137 OFW G3264

TU1 8050128 Tuner UV 816

FE3-4 6000038 Ferrite core

X1 8090105 Crystal 10.0MHz

P1	7220713	Plug 6/6 pole	P6	7220709	Plug 2/2 pole
P2	7220710	Plug 3/3 pole	P7	7220711	Plug 4/4 pole
P3-	7220712	Plug 5/5 pole	P8	7220709	Plug 2/2 pole
P4			P9	7220711	Plug 4/4 pole
P5	7220710	Plug 3/3 pole			

PCB 38, 8007779
Tuner & IF Pal I

IC8Δ 8340340 101 4053

TR15- 8320509 20 BC 548B

TR16
TR28 8320510 20 BC 558B

D21 8300779 214 1N 4531

C104 4200510 10μF 20% 16V

C105- 4200544 22μF 20% 16V

C106 4200510 10μF 20% 16V

C107 4200510 10μF 20% 16V

C109 4100238 3.3nF 5% 63V

C110 4130230 100nF 20% 63V

C111 4200510 10μF 20% 16V

BP3 8030033 Cer filter 6MHz

SW2 8030159 OFW J3251

TU1 8050140 Tuner UHF MTX

P10 7220710 Plug 3/3 pole

Other electrical parts like PCB 38 Pal B/G

Δ indicates that static electricity may destroy the component.

PCB 40, 8007859
Picture-in-picture
(Accessories)

IC1	8341191	136	TEA 5640C	IC7	8341646	136	SDA 9086-3
IC2Δ	8341230	136	4060	IC8	8341442	136	SDA 9087
IC3	8341131	136	TDA 2579A	IC9	8341443	136	SDA 9088
IC6	8341363	136	TDA 8443A				

TR1	8320509	20	BC 548B	TR17	8320509	20	BC 548B
TR2	8320239	32	BD 135	TR18	8320510	20	BC 558B
TR3	8320615	51	BC 848B	TR20	8320510	20	BC 558B
TR4-	8320509	20	BC 548B	TR21	8320509	20	BC 548B
TR5				TR22	8320510	20	BC 558B
TR13-	8320509	20	BC 548B	TR23	8320239	32	BD 135
TR14							

D1	8300173	209	ZPD8.2V 0.4W	D9-	8300482	250	LL 4148
D2-	8300482	250	LL 4148	D14			
D3				D16	8300296	209	ZPD5.6V 0.4W
D4	8300169	209	ZPD5.1V 0.4W	D17	8300023	209	1N 4002
D5-	8300482	250	LL 4148	D18	8300058	209	1N 4148
D7				D19	8300482	250	LL 4148
D8	8300201	209	ZPD6.2V 0.4W	D21	8300058	209	1N 4148

R5	5011555	1.82kΩ 1% 1/8W	R149-	5020480	1Ω 5% 1W
R123	5020704	34.8kΩ 1% 1/4W	R150		
R133	5020495	10Ω 5% 1W	R151	5020727	18Ω 5% 1W
R140	5020480	1Ω 5% 1W			

C1	4000287	220nF -20+80% 25V	C46	4000287	220nF -20+80% 25V
C2-	4010157	10nF 10% 50V	C47-	4010166	100nF -20+80% 50V
C3			C49		
C4	4000290	22nF 10% 50V	C50-	4130230	100nF 20% 63V
C5	4200512	1μF 20% 50V	C52		
C6	4000229	150pF 5% 50V	C53-	4000234	47pF 5% 50V
C7	4200511	100μF 20% 10V	C54		
C8	4000229	150pF 5% 50V	C55	4000240	56pF 5% 50V
C9	4130313	470nF 20% 63V	C56	4200544	22μF 20% 16V
C10	4000345	1nF 5% 50V	C57	4000233	220pF 5% 50V
C11	4000280	68pF 5% 50V	C58	4010166	100nF -20+80% 50V
C12	4000281	82pF 5% 50V	C59	4010175	33nF 10% 50V
C13	4010166	100nF -20+80% 50V	C63	4010166	100nF -20+80% 50V
C14	4200516	47μF 20% 16V	C64	4200517	2.2μF 20% 50V
C15	4000279	39pF 5% 50V	C65-	4010166	100nF -20+80% 50V
C16	4010166	100nF -20+80% 50V	C66		
C17	4000279	39pF 5% 50V	C67	4000282	180pF 5% 50V
C18	4200512	1μF 20% 50V	C68	4200512	1μF 20% 50V
C19	4200508	22μF 20% 25V	C69	4000283	270pF 5% 50V
C20	4010166	100nF -20+80% 50V	C70	4200512	1μF 20% 50V
C21	4200515	4.7μF 20% 25V	C71-	4010166	100nF -20+80% 50V
C22-	4010166	100nF -20+80% 50V	C72		
C24			C73-	4000233	220pF 5% 50V
C25	4200516	47μF 20% 16V	C74		
C26	4100289	2.7nF 1% 63V	C77	4010166	100nF -20+80% 50V
C27	4000155	56pF 5% 63V	C79-	4010166	100nF -20+80% 50V
C28	4200831	470μF 20% 10V	C80		
C29	4000233	220pF 5% 50V	C85-	4000278	27pF 5% 50V
C30	4000242	120pF 5% 50V	C87		
C31	4000278	27pF 5% 50V	C88	4200512	1μF 20% 50V
C32	4010107	22nF -20+80% 40V	C91	4000204	100pF 5% 63V
C33	4000278	27pF 5% 50V	C92	4000138	33pF 5% 63V
C34	4010107	22nF -20+80% 40V	C93	4010155	220pF 10% 50V
C35	4000140	27pF 5% 63V	C95-	4010128	470pF 10% 50V
C37	4000239	33pF 5% 50V	C96		
C38	4000241	100pF 5% 50V	C97-	4130306	100nF 10% 63V
C39	4010157	10nF 10% 50V	C99		
C40	4000290	22nF 10% 50V	C100	4200600	470μF 20% 16V
C41	4200672	22μF 20% 16V	C101	4200510	10μF 20% 16V

L1	8020608	Coil 10μH 5%	L4	8020608	Coil 10μH 5%
L2	8020552	Coil 10μH 10%	L5-	8020916	Coil 47μH
L3	8020830	Coil 10μH	L6		



Resistors not referred to are standard, see page 3-20

Crossover network, LX 5000
8039096, right
8039093, left

DL1 6240012 Delay line 64 μ S

X1 8090000 Crystal 4.00MHz

P107 7220717 Plug 10/10 pole
 P108 7220712 Plug 5/5 pole

R1 5020803 3.3 Ω 5% 2W
 R3 5020447 15 Ω 5% 2W

C1 4200560 2.2 μ F 20% 23V

L1 6850144 Coil 330 μ H
 L2 6850142 Coil 150 μ H

P49 7210326 Plug 2/2 pole, right
 P50 7210326 Plug 2/2 pole, left

Crossover network, LX 6000
8007992, right
8007919, left

R1 5021152 10 Ω 5% 2W
 R2 5021152 10 Ω 5% 2W
 R3 5020781 2.2 Ω 5% 2W

C1 4200387 4.7 μ F 20% 23V
 C2 4200336 6.8 μ F 20% 23V

L1 6850220 Coil 800 μ H

P49 7210326 Plug 2/2 pole, right
 P50 7210326 Plug 2/2 pole, left

Crossover network, MX 6000
8007703

R1 5021152 10 Ω 5% 2W
 R2 5021152 10 Ω 5% 2W
 R3 5020781 2.2 Ω 5% 2W

C1 4200336 6.8 μ F 20% 23V
 C2 4200682 8.2 μ F 10% 35V

L1 6850205 Coil 560 μ H

P49 7210326 Plug 2/2 pole, right
 P50 7210326 Plug 2/2 pole, left

Beolink 1000

For remote control Beolink 1000, see the service manual
 "MASTER CONTROL LINK", no. 3538711 page 1-15.

Standard Resistors:

Resistors 5% 1/2 W

	x1	x10	x100	x1K	x10K	x100K	x1M	x10M
1.0		5011000	5011013	5011028	5011044	5010313	5011069	5011083
1.2	5011406	5011001	5011014	5011030	5011045	5011058	5010421	
1.5	5010727	5011002	5011015	5011031	5011046	5011059	5011071	
1.8	5010857	5010787	5011016	5011033	5011047		5011072	
2.2	5011335	5010708	5010815	5011034	5011048	5011061	5011074	
2.7	5011612	5010803	5011018	5010055	5011049	5011062	5011075	
3.3	5010255	5011007	5011019	5011037		5011063	5010381	
3.9		5010782	5011021	5010700	5011051		5010392	
4.7	5010765	5011009	5011022	5010035	5010036	5011065	5011078	
5.6		5011010	5011023	5011041		5011066	5011079	
6.8	5010874	5011011	5011024	5011042	5010810	5011067	5011080	
8.2		5011012	5011026	5011043	5011038	5011068	5011081	

Resistors 5% 1/4 W

	x1	x10	x100	x1K	x10K	x100K	x1M	x10M
1.0	5010592	5010506	5010065	5010040	5010059	5010049	5010054	5010638
1.2		5010595	5010128	5010153	5010046	5010047	5010665	
1.5	5011348	5010468	5010057	5010247	5010053	5010063	5010093	
1.8		5010822	5010362	5010066	5010135	5010072	5010791	
2.2	5010682	5010448	5010092	5010064	5010079	5010120	5010245	
2.7	5010925	5010403	5010000	5010298	5010141	5010083	5010431	
3.3		5010253	5010044	5010076	5010075	5010117	5010848	
3.9	5011377	5010622	5010070	5010069	5010060	5010073	5010714	
4.7	5010888	5010411	5010058	5010048	5010045	5010077	5011513	
5.6	5010706	5010151	5010067	5010041	5010061	5010071	5010658	
6.8	5010904	5010039	5010144	5010052	5010062	5010074		
8.2	5010880	5010056	5010068	5010154	5010091	5010505		

Resistors 5% 1/8 W

	x1	x10	x100	x1K	x10K	x100K	x1M	x10M
1.0		5011464	5011357	5010816	5010935	5011440	5011459	5020875
1.2		5011351	5011084	5011442	5011338	5011341	5011175	
1.5		5011463	5011443	5011178	5011364	5011398	5011460	
1.8			5011350	5011361	5011344	5011468		
2.2	5011032	5011376	5010886	5011353	5010833	5011369	5011342	
2.7		5011471	5011355	5011362	5011366	5011370	5011478	
3.3		5011347	5011337	5010827	5011346	5011371	5011462	
3.9		5011438	5011817	5011157	5011457	5011372	5020876	
4.7	5011363	5011038	5011441	5011363	5010937	5011343	5011611	
5.6		5011412	5011358	5010885	5011166	5011340		
6.8		5011356	5011336	5010839	5011367	5011458		
8.2		5011466	5011354	5011339	5011368	5011373		

Resistors SMD 2% 1/8 W

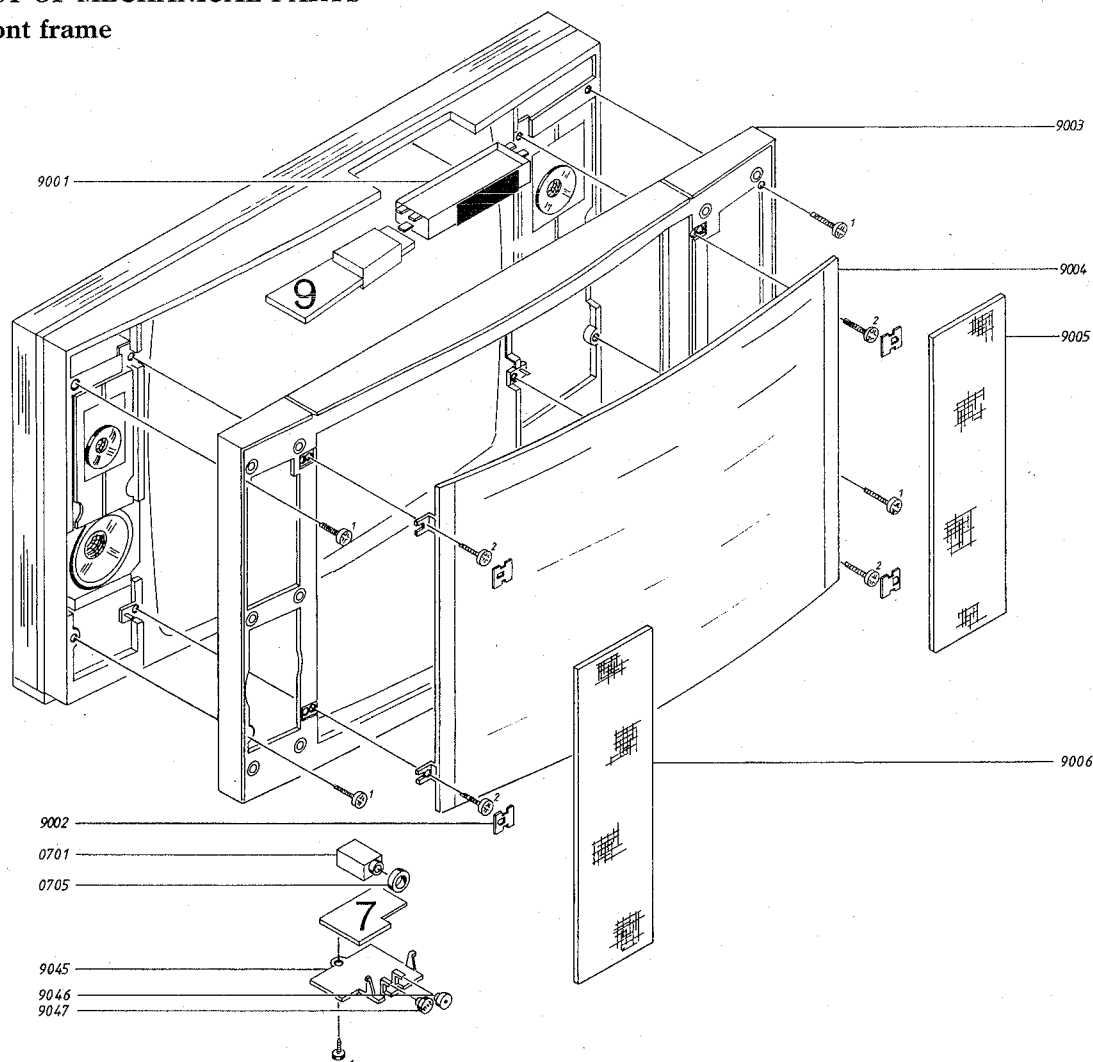
SMD 5% 1/8 W

	5%	2%	2%	2%	2%	2%	5%	5%
	x1	x10	x100	x1K	x10K	x100K	x1M	x10M
1.0	5011623	5011647	5011218	5011227	5011241	5011256	5011267	5011730
1.1	5011624	5011648	5011669	5011681	5011689	5011694	5011707	
1.2	5011625	5011649	5011219	5011682	5011490	5011257	5011708	
1.3	5011626	5011650	5011670	5011683	5011242	5011258	5011709	
1.5	5011627	5011651	5011220	5011228	5011243	5011259	5011710	
1.6	5011628	5011652	5011671	5011684	5011690	5011695	5011711	
1.8	5011629	5011653	5011672	5011229	5011244	5011260	5011712	
2.0	5011630	5011654	5011673	5011685	5011691	5011696	5011713	
2.2	5011216	5011655	5011674	5011230	5011245	5011261	5011714	
2.4	5011634	5011656	5011675	5011686	5011246	5011697	5011715	
2.7	5011635	5011657	5011497	5011231	5011247	5011262	5011716	
3.0	5011731	5011658	5011499	5011500	5011692	5011698	5011717	
3.3	5011217	5011659	5011676	5011232	5011248	5011263	5011718	
3.6	5011636	5011660	5011677	5011687	5011249	5011264	5011719	
3.9	5011637	5011661	5011221	5011233	5011491	5011699	5011720	
4.3	5011638	5011662	5011498	5011688	5011492	5011700	5011721	
4.7	5011639	5011269	5011222	5011234	5011250	5011265	5011722	
5.1	5011640	5011663	5011678	5011235	5011493	5011701	5011723	
5.6	5011641	5011664	5011223	5011236	5011251	5011702	5011724	
6.2	5011642	5011665	5011224	5011237	5011693	5011703	5011725	
6.8	5011643	5011666	5011225	5011238	5011252	5011704	5011726	
7.5	5011644	5011667	5011679	5011239	5011253	5011705	5011727	
8.2	5011645	5011270	5011226	5011240	5011254	5011266	5011728	
9.1	5011646	5011668	5011680	5011489	5011255	5011706	5011729	

(Glue dots, approx. 200, part no. 3181932).

LIST OF MECHANICAL PARTS

Front frame



Beovision LX 6000

9001	3131325	House f/IR	9006	3451187	Loudspeaker panel, left
9002	3164570	Cap	9045	3131324	Cap
9003	3414146	Front frame	9046	2776032	Button, mains switch
9004	3450890	Glassplate	9047	2776033	Button, P-step
	3950043	Rubber string			
9005	3451188	Loudspeaker panel, right			

Beovision LX 5000

9001	3131325	House f/IR	9006	3451189	Loudspeaker panel, left
9002	3164570	Cap	9045	3131324	Cap
9003	3414136	Front frame	9046	2776032	Button, mains switch
9004	3450888	Glassplate	9047	2776033	Button, P-step
	3950044	Rubber string			
9005	3451190	Loudspeaker panel, right			

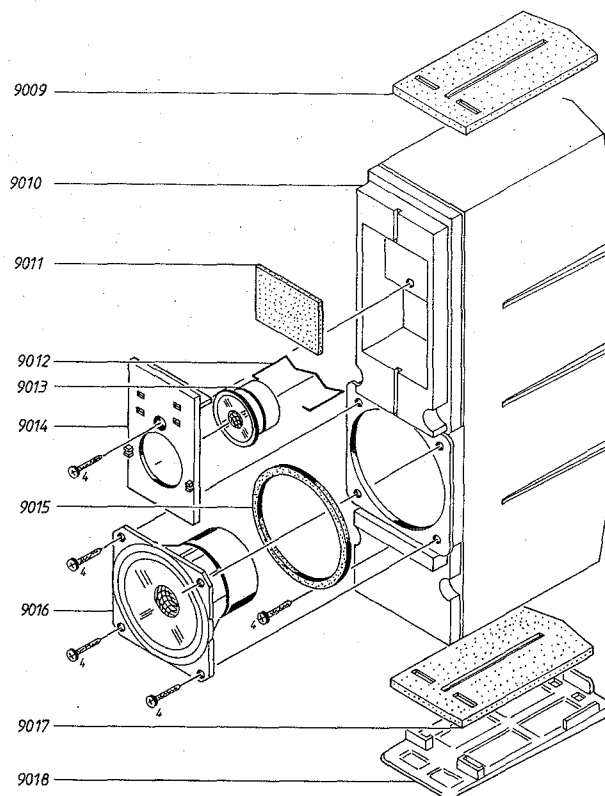
07Module	8007609	PCB 7, Headphone
0701	2710742	Jack plug
0705	2938282	Bushing

09Module	8007789	PCB 9, IR Transceiver	3375070	Linse f/IR
	3302467	Shield, top	3152809	Holder f/diode
	3302468	Shield, bottom		

Survey of screws

1	2019018	Screw 4 x 16mm
2	2021013	Screw 5 x 20mm

Loudspeaker cabinet



Beovision LX 6000

9009	3152614	Pressure pad
9010	3430373	Loudspeaker cabinet, right
	3430374	Loudspeaker cabinet, left
9011	3907051	Pressure pad
9012	2819207	Spring
9013	8480230	Treble speaker
9014	3152859	Loudspeaker suspension
9015	3340094	Gasket
9016	8480214	Bass speaker
9017	3152614	Pressure pad
9018	3035054	Plastic foot
	8007992	Crossover network, right
	8007919	Crossover network, left

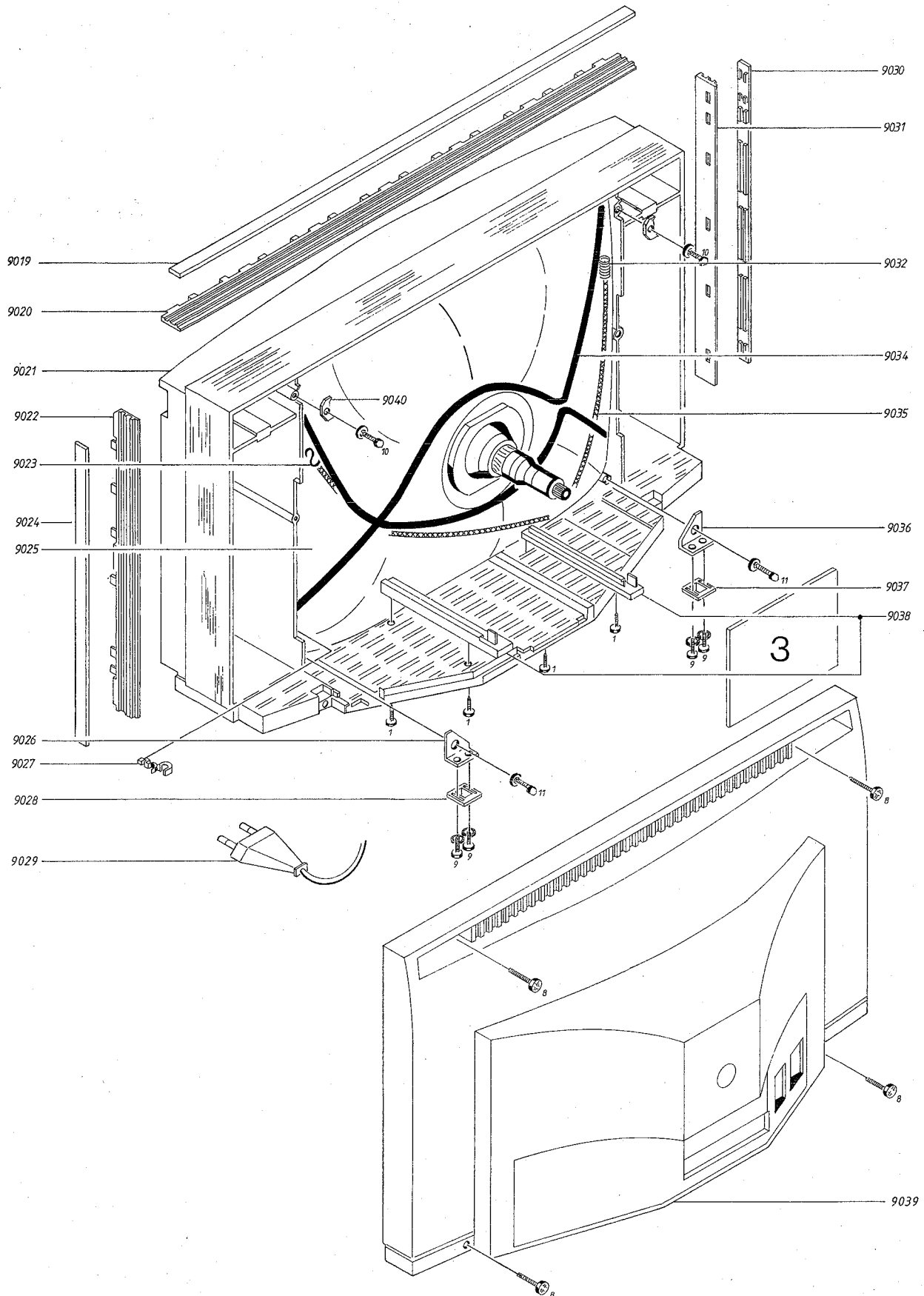
Beovision LX 5000

9009	3152615	Pressure pad
9010	3430376	Loudspeaker cabinet, right
	3430377	Loudspeaker cabinet, left
9011	3907051	Pressure pad
9012	2819207	Spring
9013	8480204	Treble speaker
9014	8039096	Crossover network, right
	8039093	Crossover network, left
9015	3340047	Gasket
9016	8480164	Bass speaker
9017	3152615	Pressure pad
9018	3035054	Plastic foot

Survey of screws

4	2015133	Screw 3.5 x 16mm
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Cabinet



Cabinet Beovision LX 6000

9019	2569292	Profile, top
9020	3152415	Holder, top
9021	3414603	Cabinet, rosewood
	3414613	Cabinet, grey metallic
	3414825	Cabinet, white
	2620076	Felt washer
	3946110	Moulding set
9022	3152539	Holder, right
9023	2510119	Clamp
9024	2569232	Profile, side
9025	8200065	Picture tube 28"
9026	3152446	Holder
9027	3152778	Holder
9028	2576200	Spacer
9029	6275993	Mains lead w/filter
9030	2569232	Profile, side
9031	3152438	Holder, left
9032	2810189	Spring
9034	8022222	Degaussing coil
9035	7510041	Ground current
9036	3152432	Holder
9037	2576200	Spacer
9038	3152803	Set of rails
9039	3414336	Rear cover
9040	2576170	Spacer

03Module 8007669 PCB 3, Video Output

Cabinet Beovision LX 5000

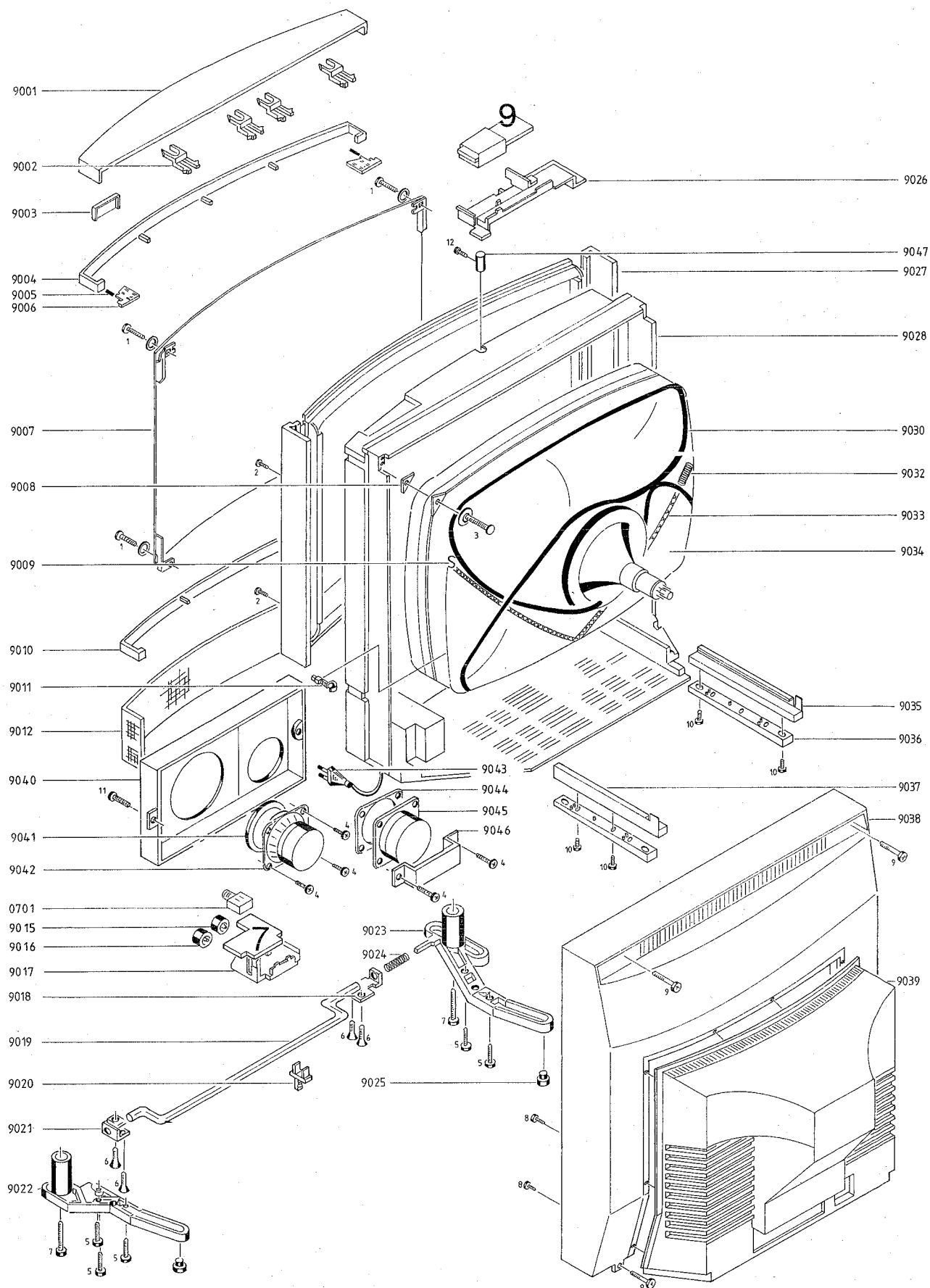
9019	2569293	Profile, top
9020	3152451	Holder, top
9021	3414303	Cabinet, rosewood
	3414313	Cabinet, grey metallic
	3414525	Cabinet, white
	2620076	Felt washer
	3946109	Moulding set
9022	3152538	Holder, right
9023	2510119	Clamp
9024	2569233	Profile, side
9025	8200064	Picture tube 25"
9026	3152446	Holder
9027	3152778	Holder
9028	2576200	Spacer
9029	6275993	Mains lead w/filter
9030	2569233	Profile, side
9031	3152452	Holder, left
9032	2810189	Spring
9034	8022249	Degaussing coil
9035	7510040	Ground current
9036	3152432	Holder
9037	2576200	Spacer
9038	3152803	Set of rails
9039	3414436	Rear cover
9040	2576170	Spacer

03Module 8007669 PCB 3, Video Output

Survey of screws

1	2019018	Screw 4 x 16mm
8	2021012	Screw 5 x 25mm
9	2044042	Screw 5 x 20mm w/washer
10	2044048	Screw 5 x 25mm w/washer
11	2044047	Screw 5 x 15mm w/washer

Beovision MX 6000



Beovision MX 6000

9001	3451008	Lid	9030	8022222	Degaussing coil
9002	2391070	Hinge	9032	2810189	Tension spring
9003	3322092	Window	9033	7510041	Ground current
9004	3450701	Cap	9034	8200065	Picture tube
9006	3164687	Holder	9035	3152677	Guide rail, left
9007	3451039	Contrast screen	9036	2576242	Spacer f/rail
9008	2640053	Spacer	9037	3152678	Guide rail, right
9009	2510119	Clamp	9038	3414244	Back cover, red
9010	3451072	Cap		3414245	Back cover, white
9011	3152778	Holder		3414246	Back cover, black
9012	3320173	Loudspeaker panel		3414248	Back cover, blue
9013	8480164	Loudspeaker		3414249	Back cover, grey
9014	3340074	Gasket	9039	3430472	Back cover, small
9015	2776033	Press button-STEP	9040	3440121	Loudspeaker panel, right
9016	2776032	Press button - ●		3440120	Loudspeaker panel, left
9017	3152797	Holder		3340099	Rubber string
9018	3031175	Fitting f/tilting foot, left		3340097	Gasket
9019	3103238	Tilting foot	9041	8480214	Loudspeaker, bass
9020	3152566	Holder f/tilting foot	9042	6275993	Mains lead w/filter
9021	3031129	Fitting f/tilting foot, right	9043	6275989	Mains lead AUS
9022	3031157	Fitting f/bottom, right	9044	3340098	Gasket
9023	3031234	Fitting f/bottom, left	9045	8480230	Loudspeaker, treble
9024	2819237	Spring	9046	3152817	Holder
9025	3035032	Rubber foot	9047	2576248	Spacer
9026	3131329	Holder		8007703	Crossover network
9027	3320159	Front frame w/rubber string		3332041	Damping material, small
	3950029	Rubber string		3332042	Damping material, large
9028	3320131	Chassis w/foot			
	3946083	Tightening, side			
	3946084	Tightening, top/bottom			
	3103287	Foot			

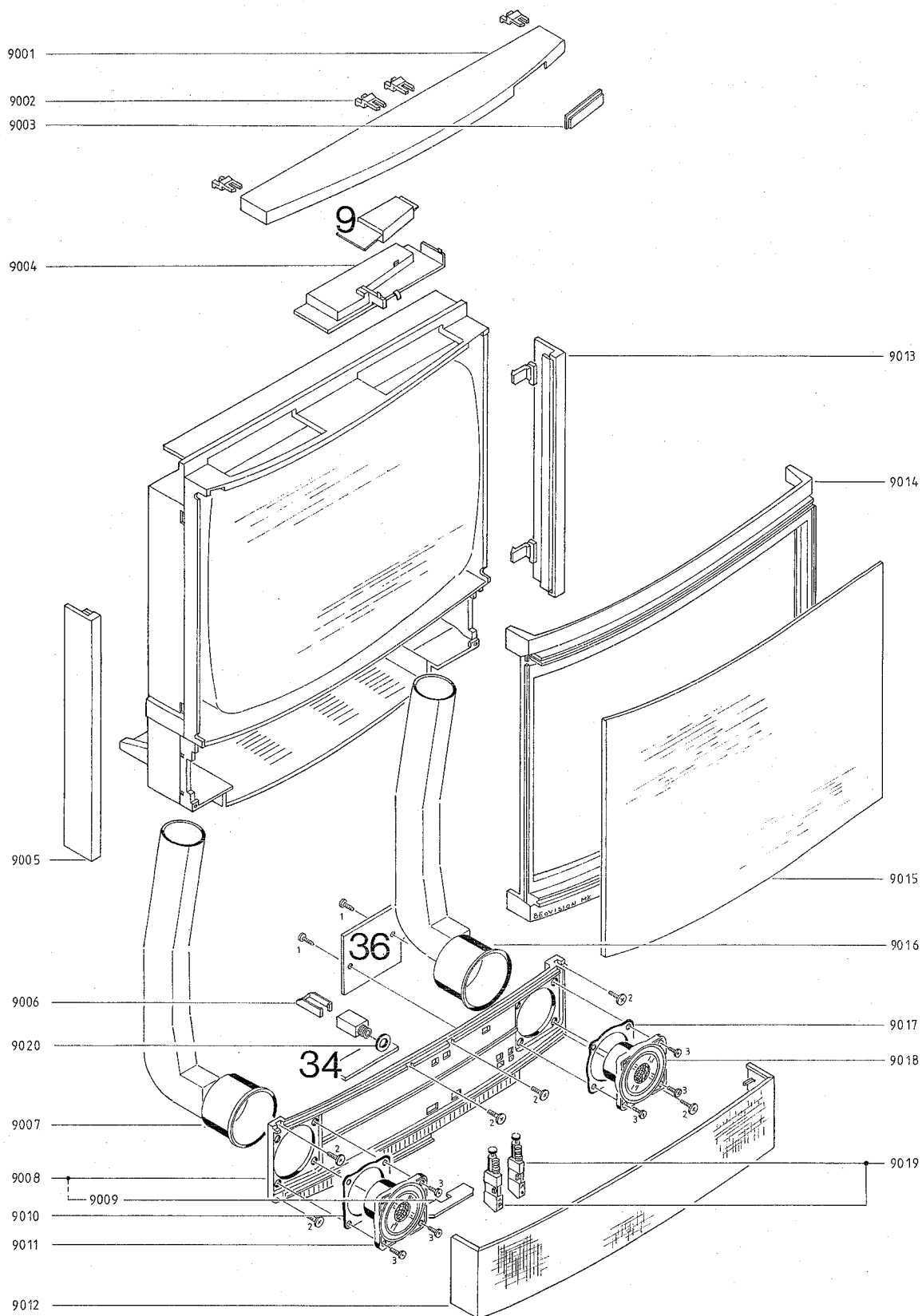
07Modul	8007609	PCB 7, Headphone
0701	7210742	Socket headphone 3.5mm

09Modul	8007789	PCB 9, IR Transceiver
	3302467	Shield, top
	3302468	Shield, bottom
	3375070	Linse f/IR
	3152809	Holder f/diode

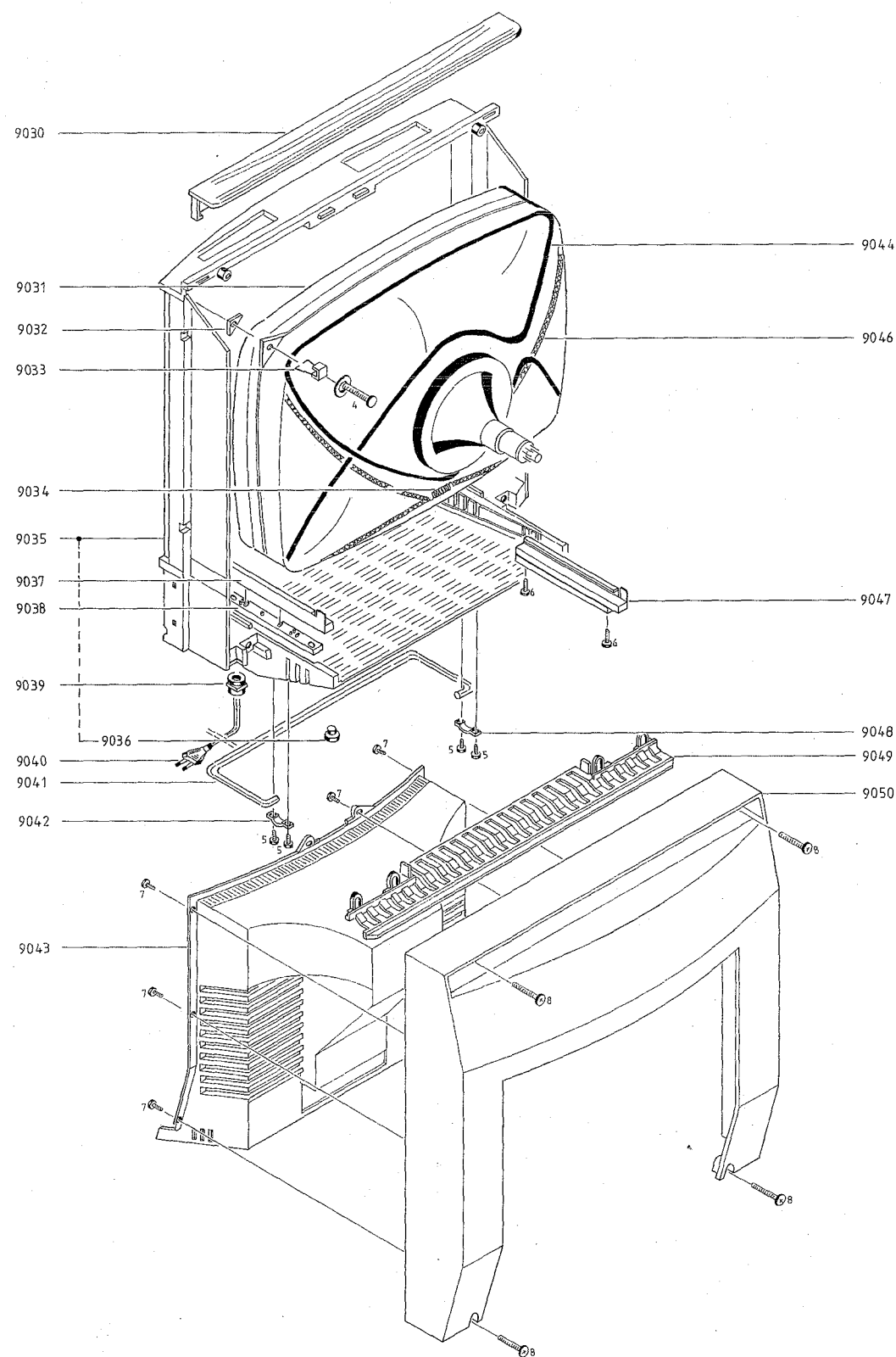
Survey of screws

1	2015129	Screw 3.5 x 12mm w/washer
2	2013123	Screw 3 x 10mm
3	2044048	Screw 5 x 25mm w/washer
4	2015142	Screw 3.5 x 10mm
5	2019018	Screw 4 x 16mm
6	2019015	Screw 4 x 14mm
7	2021003	Screw 5 x 35mm
8	2019017	Screw 4 x 10mm
9	2021010	Screw 5 x 25/11mm
10	2019018	Screw 4 x 16mm
11	2019021	Screw 4 x 12mm
12	2013182	Screw 3 x 20mm

Front frame Beovision MX 4000



Cabinet
Beovision MX 4000



Front frame
Beovision MX 4000

Cabinet
Beovision MX 4000

Survey of screws

9001	3164644	Lid
9002	2391070	Hinge
9003	3322092	Window
9004	3131329	Holder
9005	3470193	Side plate
	3950028	Rubber string
9006	2510171	Clamp
9007	3132113	Loudspeaker damping tube, left
9008	3440101	Loudspeaker baffle w/foot
9009	3103286	Foot
9010	3340074	Gasket
9011	8480164	Loudspeaker
9012	3320174	Loudspeaker panel
9013	3470193	Side plate
	3950028	Rubber string
9014	3320175	Front frame
	3950020	Rubber string
9015	3451100	Contrast screen
9016	3132114	Loudspeaker damping tube, right
9017	3340074	Gasket
9018	8480164	Loudspeaker
9019	2776261	Press buttons, complete
9020	2938282	Bushing

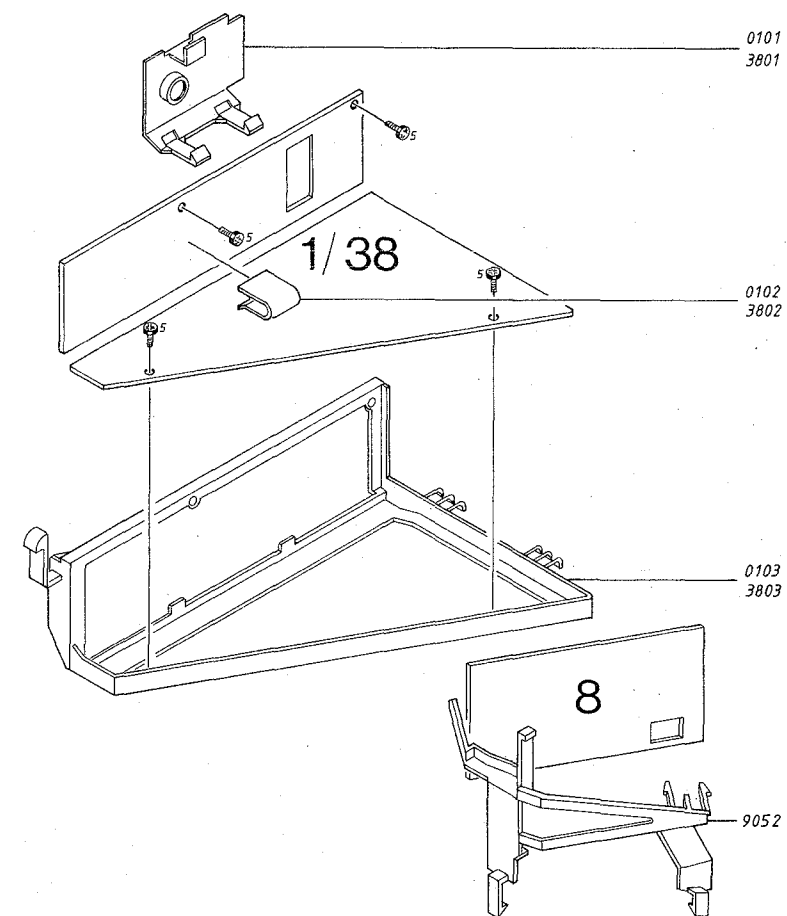
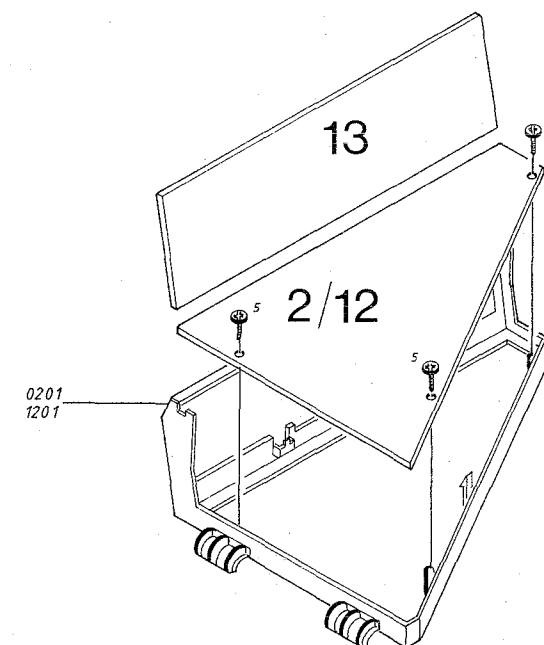
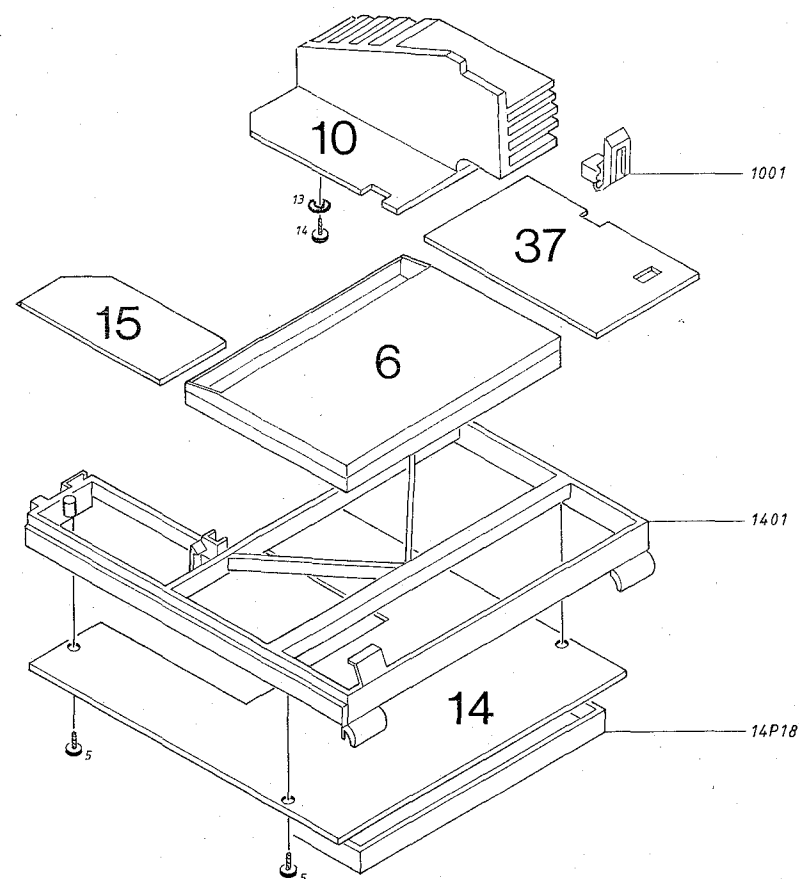
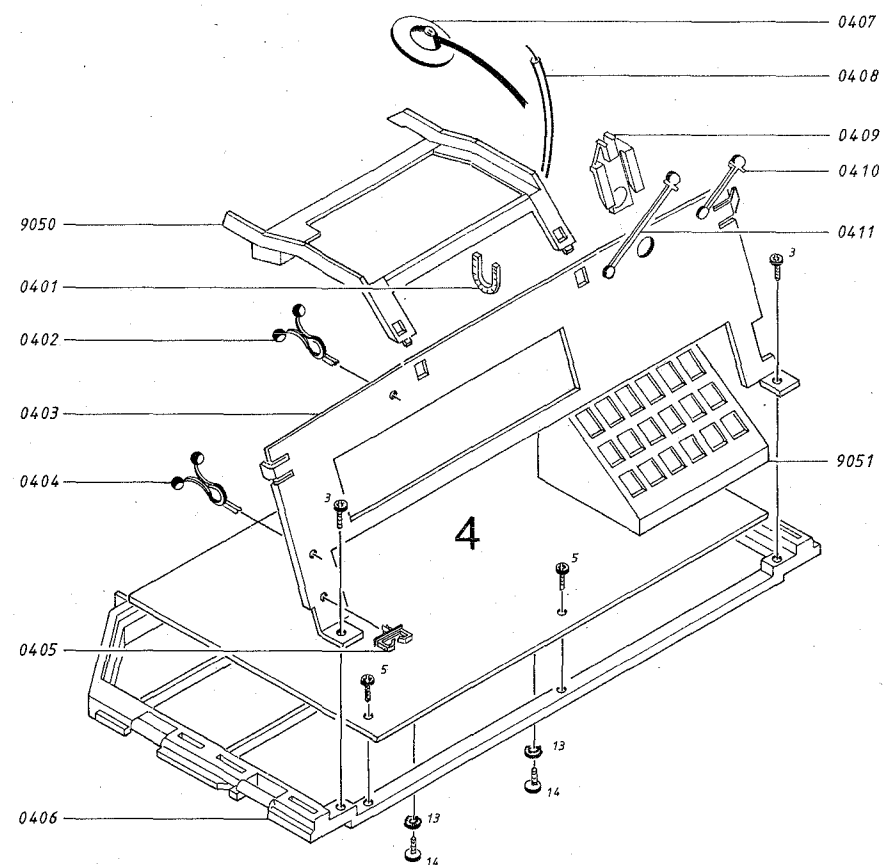
09Modul	8007789	PCB 9, IR Transceiver
	3302467	Shield, top
	3302468	Shield, bottom
	3375070	Linse f/IR
	3152809	Holder f/diode

34Modul	8007617	PCB 34, Headphone
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36Modul	8007617	PCB 36, Deflection Transformer
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9030	2530537	Carrying handle
9031	8200063	Picture tube
9032	2640053	Spacer
9033	2514066	Clamp
9034	2810189	Tension spring
9035	3320133	Chassis
	3946094	Tightening rail
9036	3035053	Rubber foot
9037	3152678	Guide rail, right
9038	2576242	Spacer f/guide rail
9039	2641119	Bushing f/mains cable
9040	6275994	Mains lead w/filter
	6275992	Mains lead AUS
9041	3103261	Tilting foot
9042	2641114	Fitting f/tilting foot
9043	3430471	Back cover, small
9044	8022325	Degaussing coil
9046	7510035	Ground current
9047	3152677	Guide rail, left
9048	2641114	Fitting f/tilting foot
9049	3444182	Grill
9050	3414164	Back cover, red
	3414165	Back cover, white
	3414166	Back cover, black
	3414168	Back cover, blue
	3414169	Back cover, grey

2	2019009	Screw 4 x 12mm
3	2013123	Screw 3 x 10mm
4	2044048	Screw 5 x 25mm w/washer
5	2019009	Screw 4 x 12mm
6	2019018	Screw 4 x 16mm
7	2019010	Screw 4 x 8mm
8	2021009	Screw 5 x 25mm



Electrical chassis

9050	3152795	Holder
9051	3300132	Shield
9052	3152676	Holder f/nicam

01Module	8007449	PCB 1, Tuner & IF B/G/L
	2515063	Wire holder
0101	3451045	Front plate
0102	3358267	Heat sink
0103	3152673	Chassis

02Module	8007629	PCB 2, Pal/Secam Decoder
	2515063	Wire holder
0201	3152672	Chassis

04Module	8007519	PCB 4, Power Supply & Deflection
	2816154	Spring clip f/TR33
	2816195	Spring clip f/IC4-TR1-D34-D36
0401	3950046	Wire holder
0402	2515063	Wire holder
0403	3152793	Shield
0404	2515063	Wire holder
0405	3152871	Wire holder
0406	3152792	Chassis
0407	6270474	EHT cable
0408	6270473	Focus cable
0409	3152683	Wire holder
0410	3152633	Service strap, short
0411	3152634	Service strap, long

06Module	8007409	PCB 6, Microcomputer 64K
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08Module	8007066	PCB 8, Nicam Pal B/G
	8007071	PCB 8, Nicam Pal I

10Module	8007569	PCB 10, Sound Output
	2622448	Mica washer
	2816195	Spring clip
1001	3152294	Wire holder

12Module	8007899	PCB 12, Pal Decoder
	2515063	Wire holder
1201	3152672	Chassis

13Module	8007579	PCB 13, Sync Processing
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14Modul	8007479	PCB 14, Double AV Switch
1401	3152794	Chassis

14P18	3168760	DIN/Scart panel
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15Module	8007739	PCB 15, St By Stabilization
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37Module	8007509	PCB 37, Teletext
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38Module	8007769	PCB 38, Tuner & IF Pal B/G
	8007779	PCB 38, Tuner & IF Pal I
	2515063	Wire holder
3801	3451045	Front plate
3802	3358267	Heat sink
3803	3152673	Chassis

Survey of screws

3	2013123	Screw 3 x 10mm
5	2013144	Screw 3 x 8mm
13	2625002	Washer
14	2038097	Screw 3 x 6mm

Survey of wire bundles

6276465 Main wire bundle
6276464 Main wire bundle w/shielded wires

0933522 Wire bundle f/LX 6000
0933523 Wire bundle f/LX 5000
0933550 Wire bundle f/MX 6000

Consist of:
3P89 - 4P14
3P90 - 2/12P30
4P22 - Deflection
7P86 - 15P83
11P85 - 15P82

0933551 Wire bundle f/MX 4000

Consist of:
3P89 - 4P14
3P90 - 2/12P30
4P22 - 36P92
9P85 - 15P82
15P83 - 34P86
34P87 - 36P88
36P93 - Deflection

Survey of wires

6276484 2/12P29 - 13P37
6276568 2/12P35 - 13P38
6276476 6P71 - 14P60
6276485 6P72 - 14P61
6276483 6P73 - 14P62
6276481 6P74 - 15P78
6276482 6P75 - 15P77
6276127 8P801 - 38P2
6276020 8P802 - 38P7
6276037 8P803 - 38P3
6276479 8P804 - 38P1

Beovision LX 5000/6000:

6276502 15P49 - Loudspeaker, right
6276501 15P50 - Loudspeaker, left

Beovision MX 6000:

6276515 15P49 - Loudspeaker, right
6276516 15P50 - Loudspeaker, left

Beovision MX 4000:

6276271 15P49 - Loudspeaker, right
6276514 15P50 - Loudspeaker, left

Owner's Manuals

3501281	Danish
3501282	Swedish
3501283	Finnish
3501284	English
3501285	German
3501286	Dutch
3501287	French
3501288	Italian
3501289	Spanish

Packing

	Beovision LX 5000:
3397593	Foam packing
3917105	Foam foil
3391936	Carton f/Beolink 1000
3392083	Outer carton

	Beovision LX 6000:
3397568	Foam packing
3917105	Foam foil
3391936	Carton f/Beolink 1000
3392082	Outer carton

	Beovision MX 6000:
3397637	Foam packing
3917105	Foam foil
3391936	Carton f/Beolink 1000
3392015	Outer carton

	Beovision MX 4000:
3397620	Foam packing (4 pcs)
3397557	Foam packing (1 pcs)
3917104	Foam foil
3391936	Carton f/Beolink 1000
3391983	Outer carton

Accessories

See technical specifications, page 1-4.

Beolink 1000

For remote control Beolink 1000, see the service manual
"MASTER CONTROL LINK", no. 3538711 page 1-15.

TB 4108 - LX 5000/6000

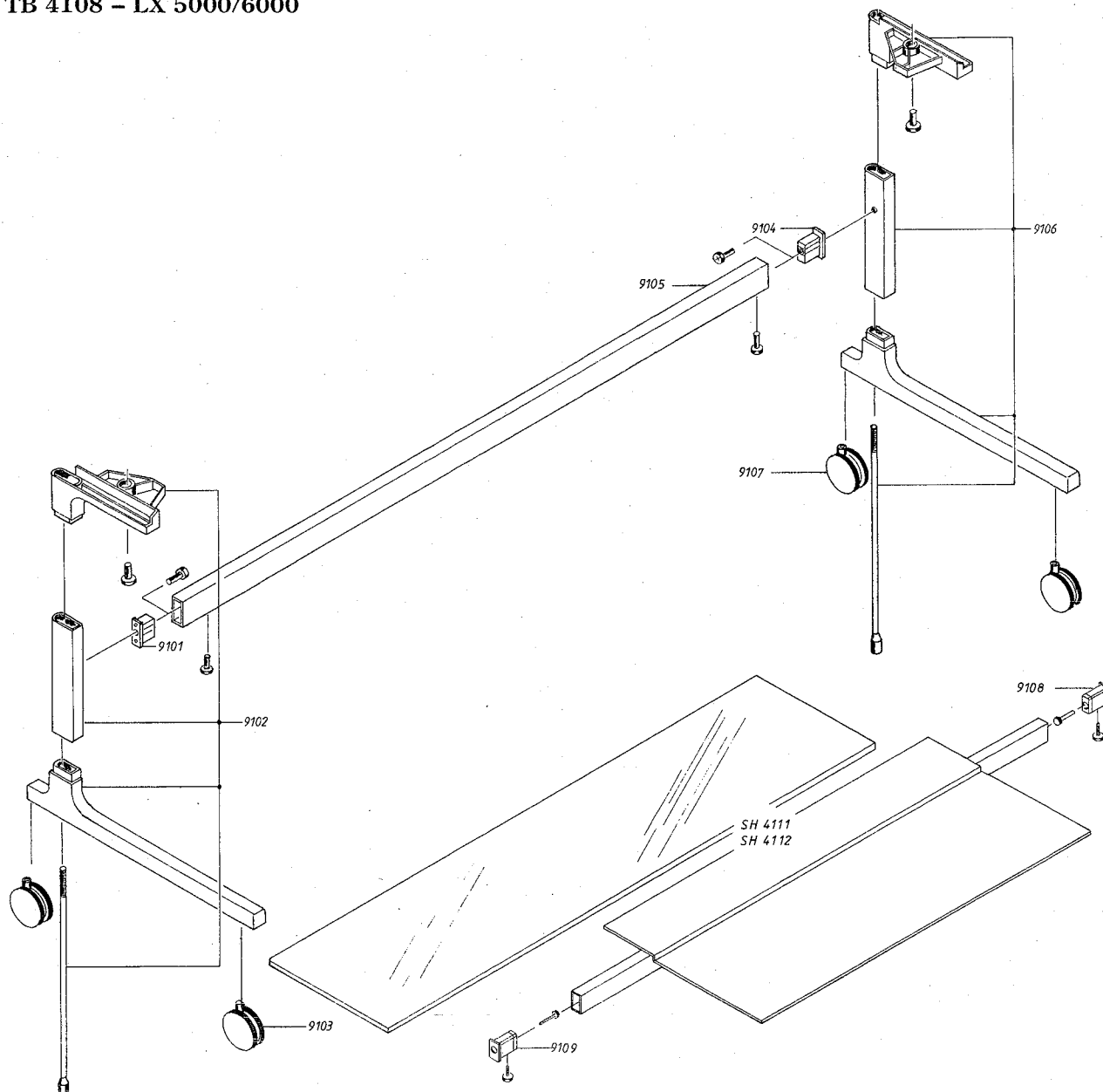


Table 1410865, white
1410866, black

9101	3152531	Holder		1410465	Traverse
9102	3103307	Post, left, white			f/LX 5000, white
	3103301	Post, left, black		1410466	Traverse
9103	3032018	Wheel, white			f/LX 5000, black
	3032019	Wheel, black	9106	3103308	Post, right, white
9104	3152531	Holder		3103300	Post, right, black
9105	1410365	Traverse	9107	3032018	Wheel, white
		f/LX 6000, white		3032019	Wheel, black
	1410366	Traverse			
		f/LX 6000, black			

Parts not shown

3390273	Bag with parts	3391963	Outer carton
3397564	Foam packing		

SH 4111
SH 4112

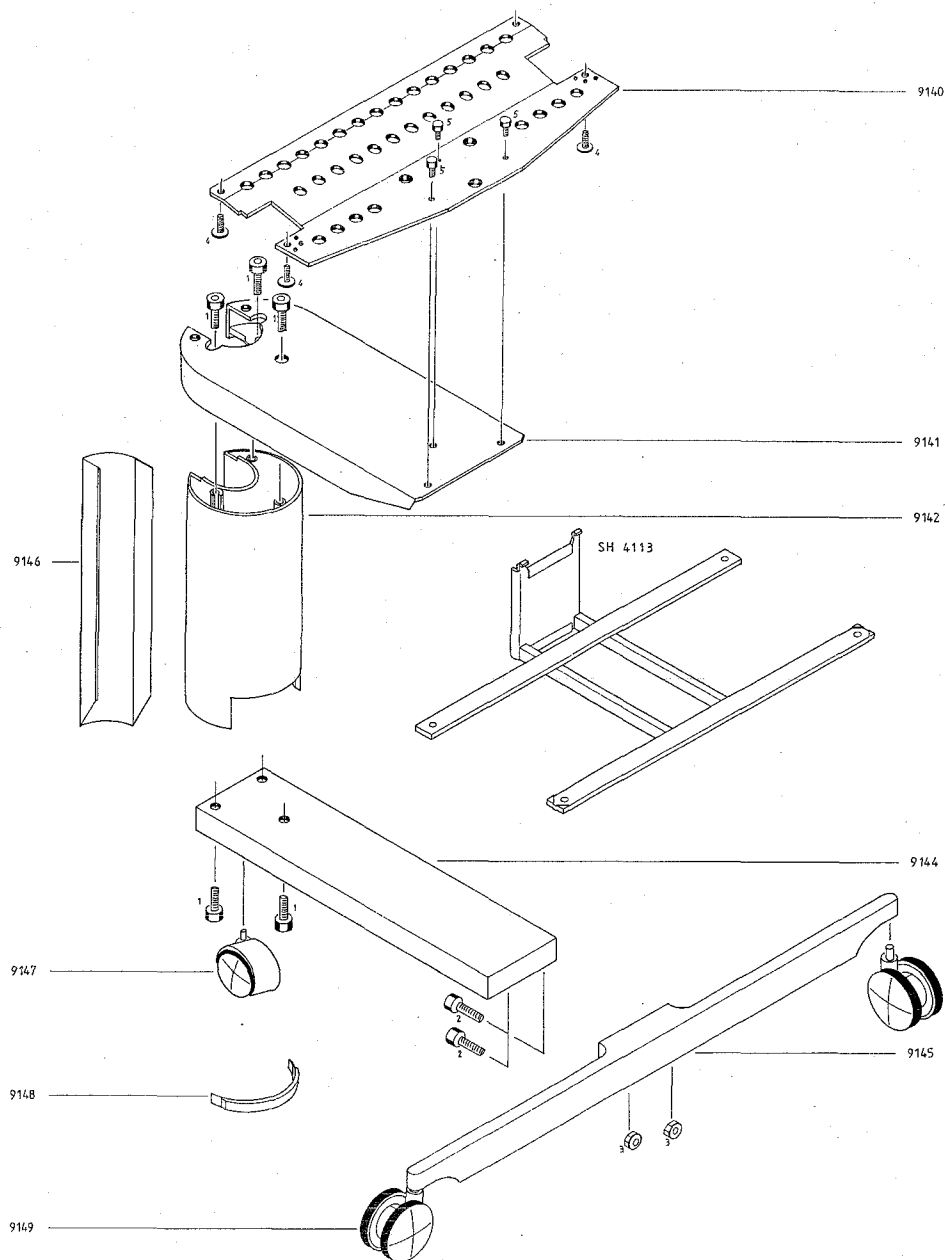
1411113	Shelf - LX 6000, metal grey
1411213	Shelf - LX 5000, metal grey

9108	3152748	Holder, right
9109	3152749	Holder, left

Parts not shown

3390409	Bag with parts	3397713	Foam packing 28"
3504411	Assembling guide	3392138	Outer carton, 28"
3397712	Foam packing 25"/28"	3392139	Outer carton, 25"

TB 4110 - MX 4000



**Table 1411066, black
1411069, silver grey**

9140	3124122	Mounting plate	9146	3164857	Cover
9141	3458756	Frame, top			f/intermediate
9142	2569241	Frame,	9147	3032022	Wheel
		intermediate piece	9148	3456187	Cover f/bottom
9144	3454699	Frame, bottom	9149	3032019	Wheel
9145	3451079	Profile			

Survey of screws

1	2046017	Screw 6 x 16mm	4	2044033	Screw 5 x 12mm
2	2044060	Screw 5 x 25mm	5	2044057	Screw 5 x 8mm
3	2380141	Nut			

Parts not shown

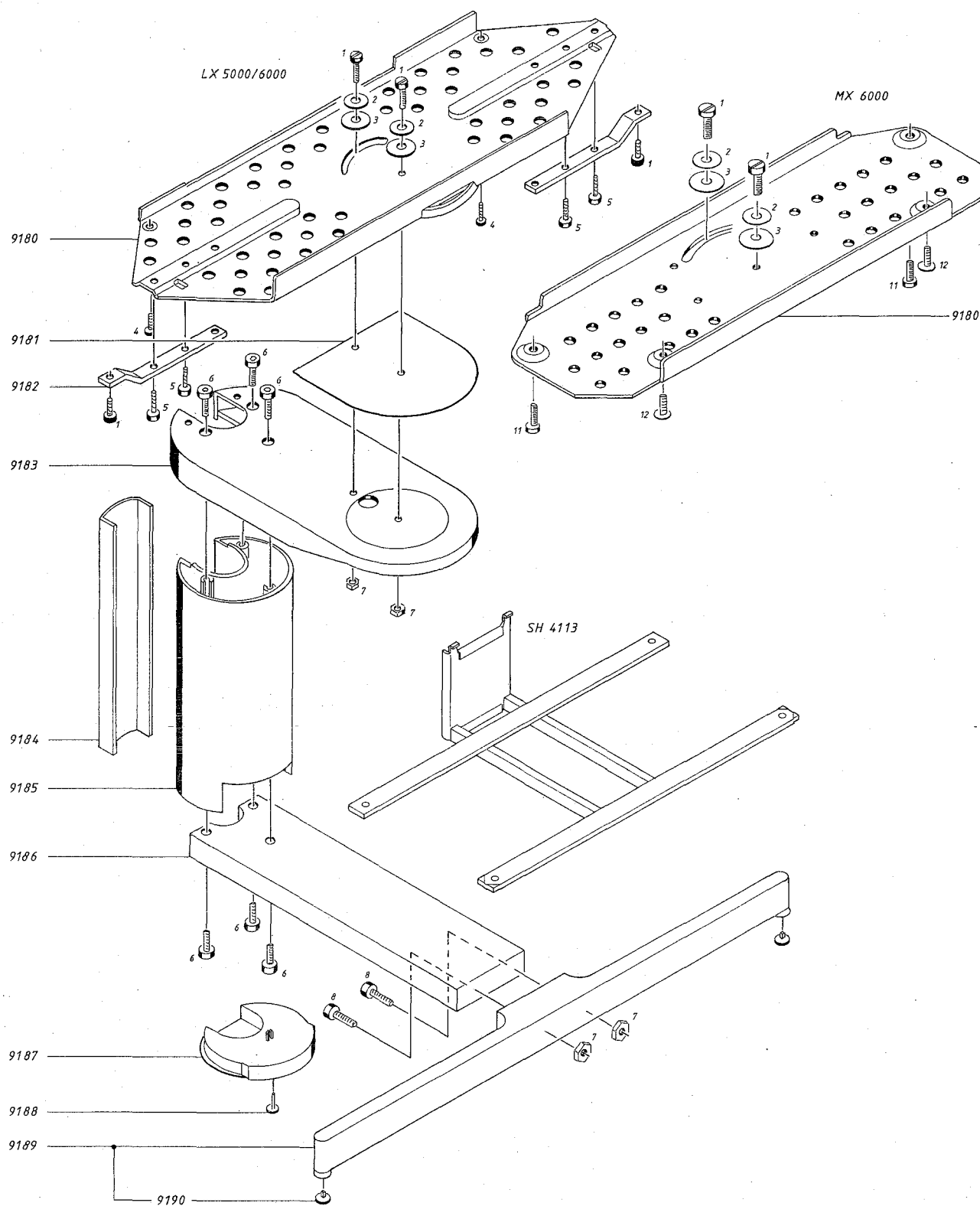
3390418	Bag w/parts
3504415	Assembling guide
3397748	Foam packing
3392169	Outer carton

SH 4113

1411366	Shelf for VX, black
3397723	Foam packing
3392149	Outer carton

ST 4117 - LX 5000/6000

ST 4109 - MX 6000



Stand: 1411766, black
1411769, silver grey

Stand: 1410966, black
1410969, silver grey

9180	3124124	Mounting plate f/LX 5000/6000
	3124117	Mounting plate f/ MX 6000
9181	3915044	Gasket
9182	3456185	Spacer
9183	3458737	Frame, top
9184	3164831	Cover
9185	2569231	Frame intermediate, piece
9186	3454619	Frame, bottom, black
	3454714	Frame, bottom, silver grey
9187	3103298	Cover f/bottom
9188	2992113	Lock pin
9189	3451052	Profile, black
	3451164	Profile, silver grey
9190	3035063	Rubber foot

**Survey of screws,
nuts and washers**

1	2046024	Screw 6 x 16mm
2	2622413	Washer
3	2622414	Washer
4	2021006	Screw 5 x 20mm
5	2046023	Screw 6 x 8mm
6	2046017	Screw 6 x 16mm
7	2380130	Nut M6
8	2046031	Screw 6 x 25mm
11	2044055	Screw 5 x 16mm
12	2021011	Screw 5 x 15mm

Parts not shown

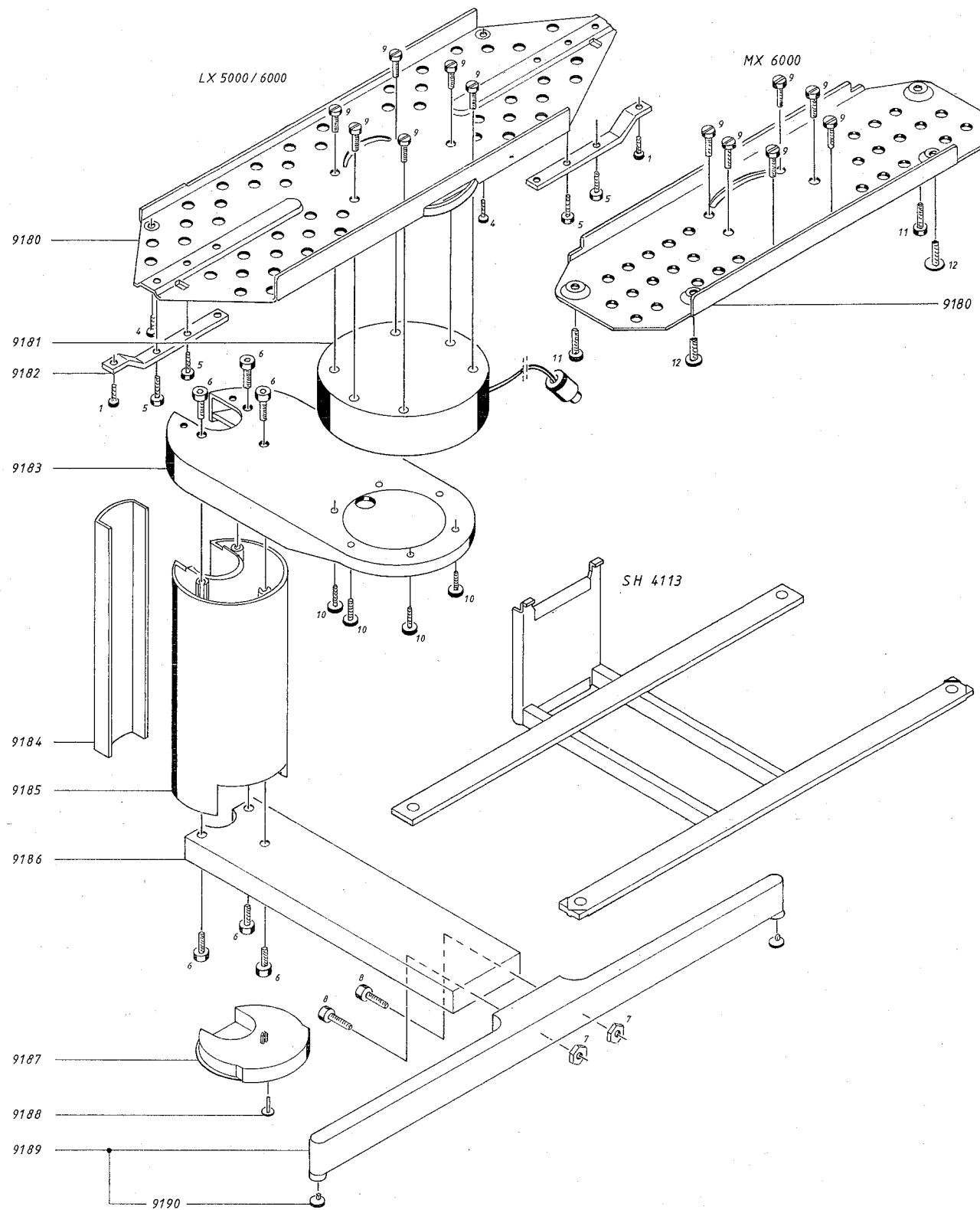
3390449	Bag w/parts f/LX 5000/6000
3390415	Bag w/parts f/MX 6000
3504444	Assembling guide f/LX 5000/6000
3504414	Assembling guide f/MX 6000
3397726	Foam packing
3392152	Outer carton

SH 4113

1411366	Shelf for VX, black
3397723	Foam packing
3392149	Outer carton

MS 4106 - LX 5000/6000

MS 4107 - MX 6000



Stand: 1410666, black
1410669, silver grey

Stand: 1410766, black
1410769, silver grey

9180	3124124	Mounting plate f/LX 5000/6000
	3124117	Mounting plate f/MX 6000
9181	8053314	Revolving unit
9182	3456185	Spacer
9183	3458737	Frame, top
9184	3164831	Cover
9185	2569231	Frame intermediate, piece
9186	3454619	Frame, bottom, black
	3454714	Frame, bottom, silver grey
9187	3103298	Cover f/bottom
9188	2992113	Lock pin
9189	3451052	Profile, black
	3451164	Profile, silver grey
9190	3035063	Rubber foot

Survey of screws and nuts

1	2046024	Screw 6 x 16mm
4	2021006	Screw 5 x 20mm
5	2046023	Screw 6 x 8mm
6	2046017	Screw 6 x 16mm
7	2380130	Nut M6
8	2046031	Screw 6 x 25mm
9	2044035	Screw 5 x 10mm
10	2044058	Screw 5 x 10mm
11	2044055	Screw 5 x 16mm
12	2021011	Screw 5 x 15mm

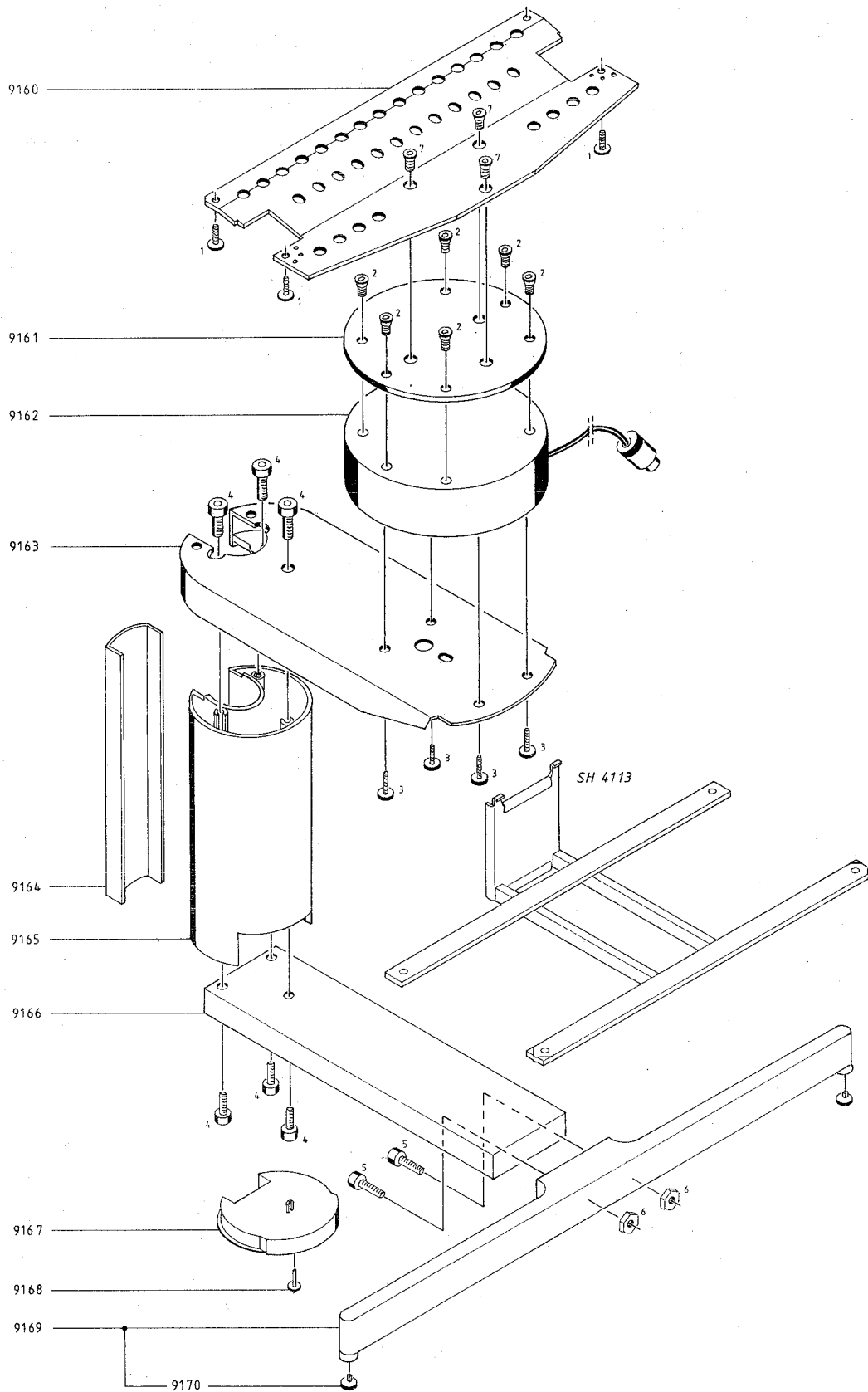
Parts not shown

3390407	Bag w/parts f/LX 5000/6000
3390412	Bag w/parts f/MX 6000
3504412	Assembling guide f/LX 5000/6000
3504418	Assembling guide f/MX 6000
3397726	Foam packing
3392152	Outer carton

SH 4113

1411366	Shelf for VX, black
3397723	Foam packing
3392149	Outer carton

MS 4116 – MX 4000



Motorized Stand:
1411666, black
1411669, silver grey

9160	3124122	Mounting plate
9161	2570045	Gasket
9162	8053314	Revolving unit
9163	3458829	Frame, top
9164	3164831	Cover f/intermediate
9165	2569065	Frame,intermediate piece
9166	3454735	Frame, bottom
9167	3103315	Cover f/bottom
9168	2992113	Lock pin
9169	3451036	Profile
9170	3035057	Rubber foot

Survey of screws

1	2044033	Screw 5 x 12mm
2	2044032	Screw 5 x 10mm
3	2044058	Screw 5 x 10mm
4	2046017	Screw 6 x 16mm
5	2044060	Screw 5 x 25mm
6	2380141	Nut M5
7	2044057	Screw 5 x 8mm

Parts not shown

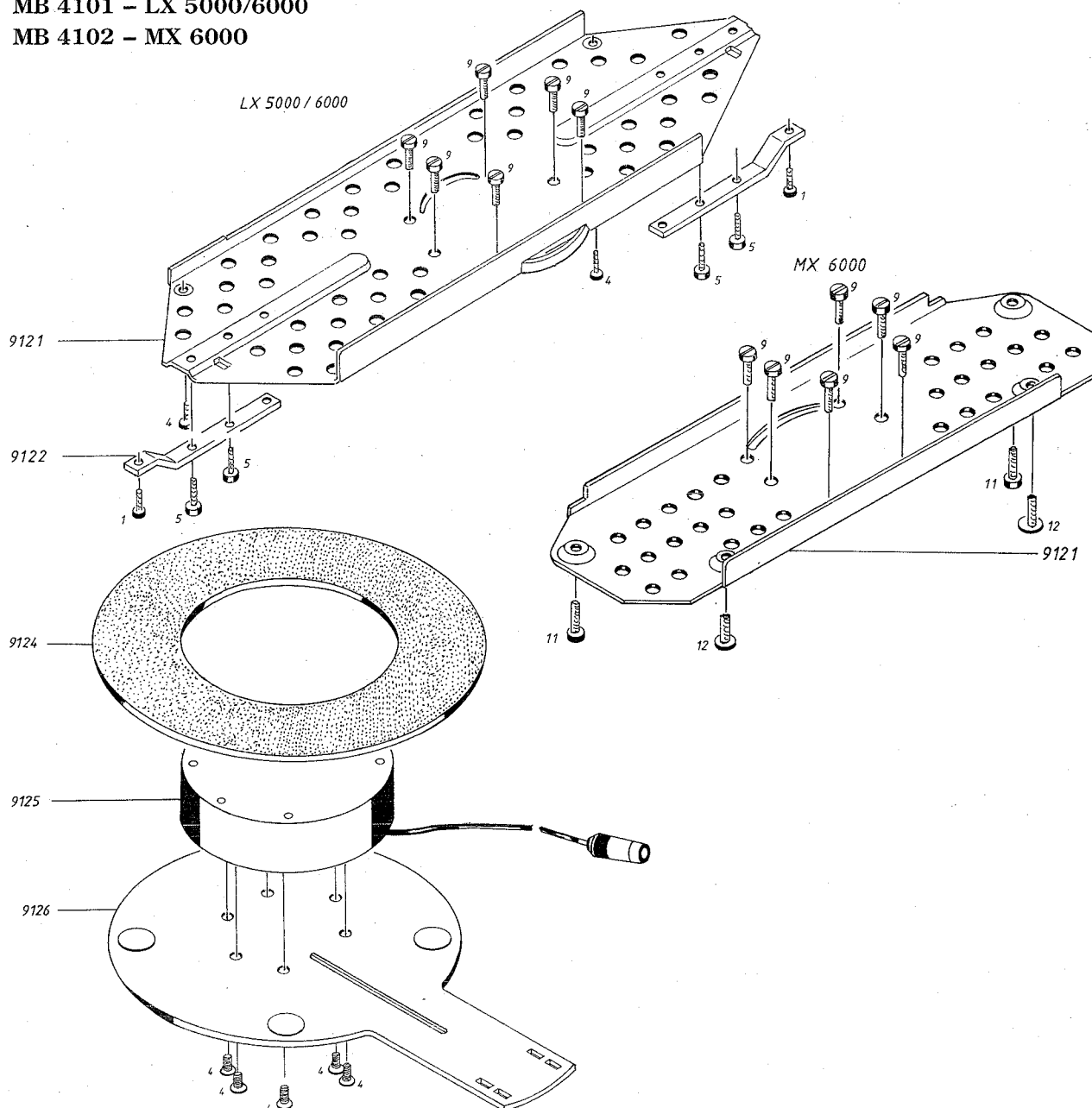
3390444	Bag w/parts
3504445	Assembling guide
3397748	Foam packing
3392169	Outer carton

SH 4113

1411366	Shelf for VX, black
3397723	Foam packing
3392149	Outer carton

MB 4101 - LX 5000/6000

MB 4102 - MX 6000



Motorized Base:

1410111, aluminium

1410211, aluminium

9121	3124124	Mounting plate f/LX 5000/6000
	3124117	Mounting plate f/MX 6000
9122	3456185	Spacer
9124	3458735	Topplate
9125	8053314	Revolving unit
9126	2752026	Bottom plate
	3103285	Plastic foot

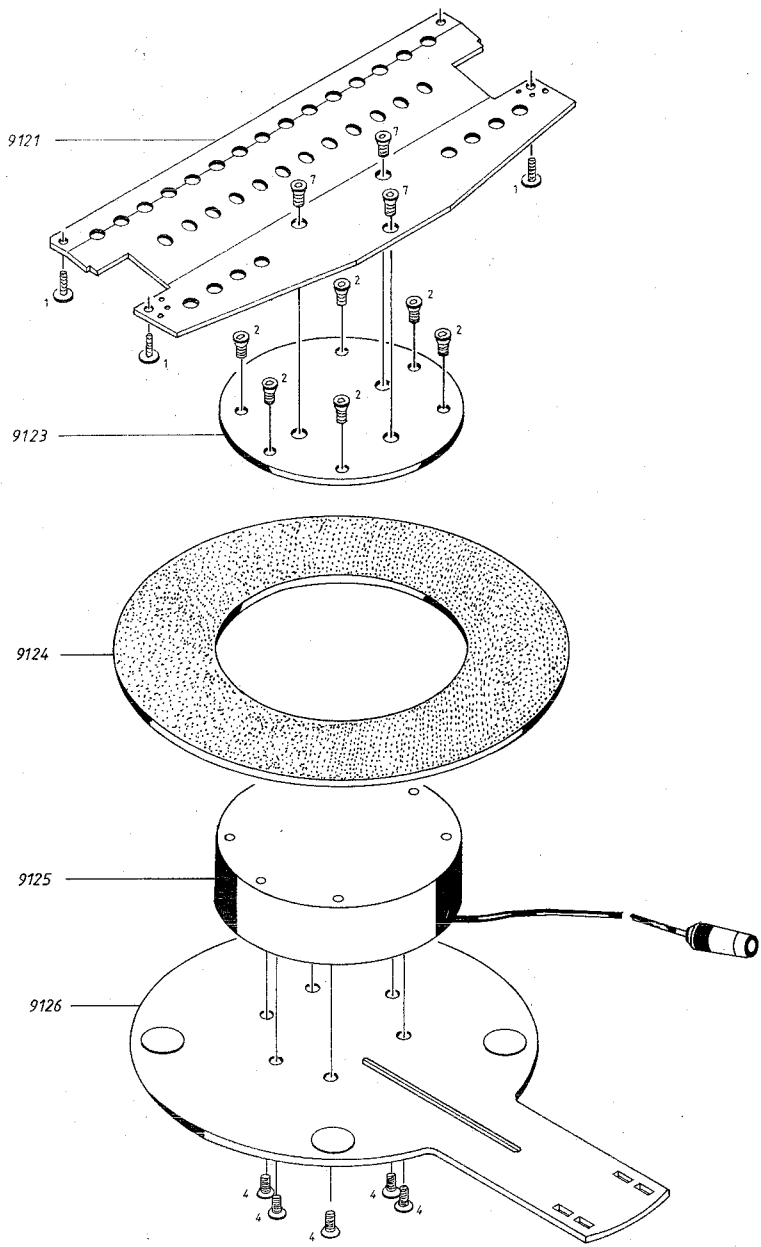
Survey of screws

1	2044035	Screw 5 x 10mm	4	2044032	Screw 5 x 10mm
2	2046023	Screw 6 x 8mm	5	2044055	Screw 5 x 6mm
3	2046024	Screw 6 x 16mm	6	2021011	Screw 5 x 15mm

Parts not shown

3390404	Bag w/parts f/LX 5000/6000
3390405	Bag w/parts f/MX 6000
3504413	Assembling guide f/LX 5000/6000
3504419	Assembling guide f/MX 6000
3397724	Foam packing f/LX 5000/6000
3397725	Foam packing f/MX 6000
3392150	Outer carton f/LX 5000/6000
3392151	Outer carton f/ MX 6000

MB 4105 – MX 4000



Motorized Base:
1410511, aluminium

9121	3124122	Mounting plate
9123	2570045	Gasket
9124	3458735	Topplate
9125	8053314	Revolving unit
9126	2752026	Bottom plate
	3103285	Plastic foot

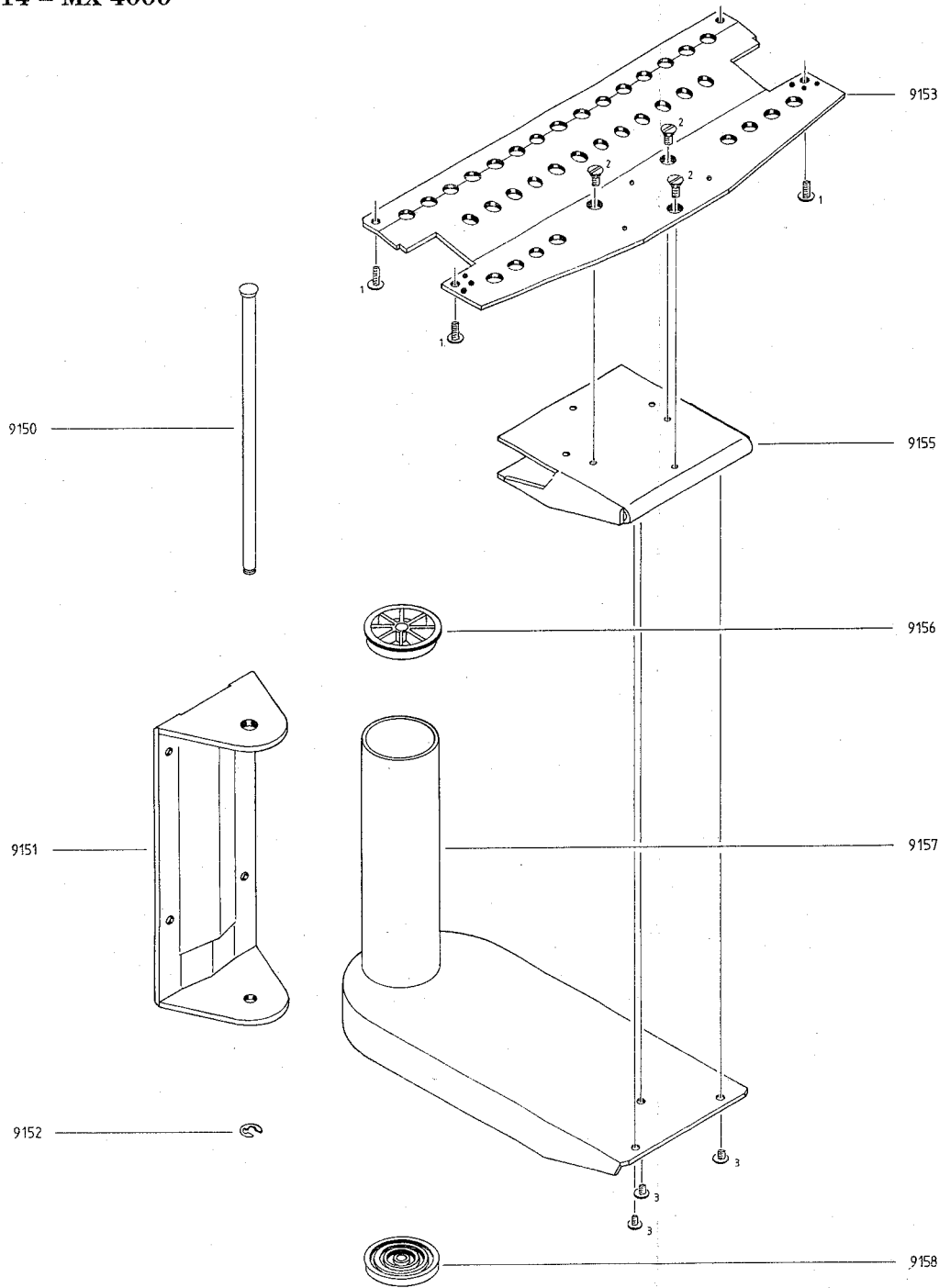
Survey of screws

1	2044033	Screw 5 x 12mm
2	2044032	Screw 5 x 10mm
3	2044057	Screw 5 x 8mm

Parts not shown

3390406	Bag w/parts
3504420	Assembling guide
3397725	Foam packing
3392151	Outer carton

WB 4114 – MX 4000



Wall Bracket: 1411466, black

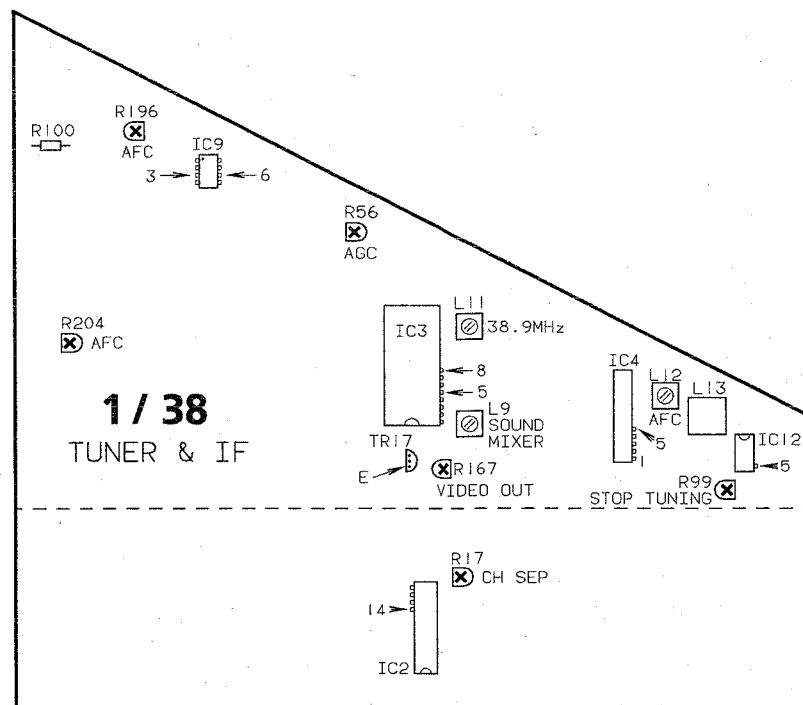
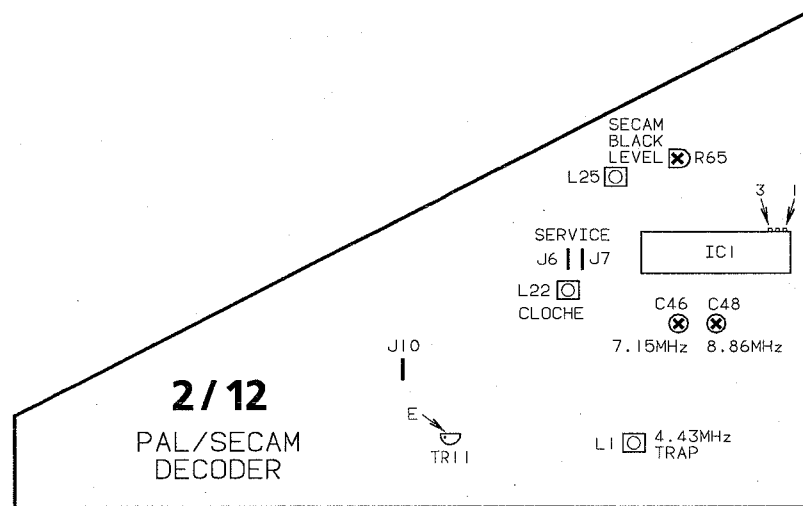
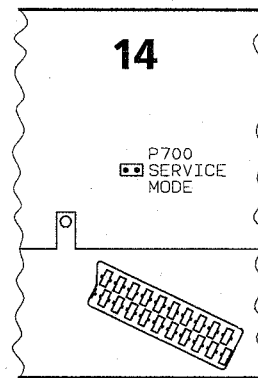
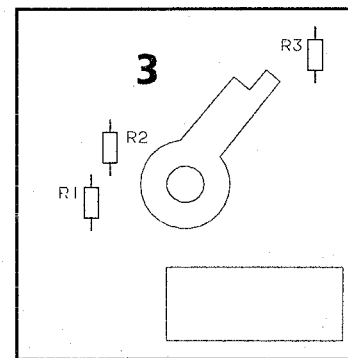
9150	2831073	Shaft	9156	2905129	Slide bearing, top
9151	3031315	Fittings	9157	3151283	Holder
9152	2390108	Snap ring	9158	2905130	Slide bearing, bottom
9153	3124122	Mounting plate			
9155	3451096	Front plate			

Survey of screws

1	2044033	Screw 5 x 12mm
2	2044057	Screw 5 x 8mm
3	2044032	Screw 5 x 10mm

Parts not shown

3390416	Bag w/parts
3504430	Assembling guide
3397749	Foam packing
3392173	Outer carton



SERVICEJUSTERINGER MED BEOLINK 1000

Service mode

Bring TV'et i SERVICEMODE:

- Fjern bagparten.
- Tast **TV**.
- Kortslut SERVICEMODE-stikket P700 på PCB14 kortvarigt.

SERVICEMODE giver mulighed for følgende servicejusteringer:

(For andre muligheder i servicemode se reparations-tips).

Billedjusteringer:

Display	Reguleringsområde
Rdr Red drive	0-63
Gdr Green drive	0-63
Rcu Red cut off balance	0-63
Gcu Green cut off balance	0-63
BRI BRilliance preset	0-7
COL COLOUR preset	0-7

Geometrijusteringer:

Display	Reguleringsområde
Hfq Horizontal frequency	0-63
Hph Horizontal phase	0-63
Ham Horizontal amplitude	0-63
Vam Vertical amplitude	0-63
Vsc Vertical s correction	0-63
Vsh Vertical shift (centering)	0-63
Vli Vertical liniarity	0-63
EWc EW corner	0-63
EWp EW parabola	0-63
EWt EW tilt	0-63

Reset

Indstil lys, farvemætning og kontrast til nominelle værdier:

- BRILLIANCE 32 **PICTURE** **▲** **▼**
- COLOUR 32 **PICTURE** **▲** **▼**
- CONTRAST 44 **PICTURE** **▲** **▼**

Gem værdierne i TV'et, **PICTURE** **STORE** **STORE** så de kan kaldes tilbage ved at taste **RESET** eller **SHIFT** **MUTE** Beolink 1000 MK III se side 7-7.

BETJENING I SERVICEMODE

- <<** **>>** Step i menu
- <** **>** eller
- ▼** **▲** Ændring af værdi
- STOP** Ud af servicemode

Når SERVICEMODE forlades er de valgte værdier gemt.

Regulering af lyd- og billedflader med Beolink 1000 virker i SERVICEMODE.

Der anvendes normalt farvetestbillede til de efterfølgende justeringer.

SERVICE ADJUSTMENTS WITH BEOLINK 1000

Service mode

Bring the TV set into SERVICE MODE:

- Remove the rear panel.
- Press **TV**.
- Short-circuit the SERVICE MODE plug, P700, on PCB14 briefly.

SERVICE MODE gives access to making the following service adjustments:

(For other options available in service mode, please see repair tips).

Picture adjustments:

Display	Adjustment range
Rdr Red drive	0-63
Gdr Green drive	0-63
Rcu Red cut-off balance	0-63
Gcu Green cut-off balance	0-63
BRI BRilliance preset	0-7
COL COLOUR preset	0-7

Geometrical adjustments:

Display	Adjustment range
Hfq Horizontal frequency	0-63
Hph Horizontal phase	0-63
Ham Horizontal amplitude	0-63
Vam Vertical amplitude	0-63
Vsc Vertical S-correction	0-63
Vsh Vertical shift (centring)	0-63
Vli Vertical linearity	0-63
EWc EW corner	0-63
EWp EW parabola	0-63
EWt EW tilt	0-63

Reset

Set the brilliance, colour saturation and contrast to nominal values:

- BRILLIANCE 32 **PICTURE** **▲** **▼**
- COLOUR 32 **PICTURE** **▲** **▼**
- CONTRAST 44 **PICTURE** **▲** **▼**

Store the values in the TV set, **PICTURE** **STORE** **STORE**, such that they may be recalled by pressing **RESET** or **SHIFT** **MUTE** Beolink 1000 MK III see page 7-7.

OPERATION IN SERVICE MODE

- <<** **>>** Step in menu
- <** **>** or
- ▼** **▲** Changing of value
- STOP** Out of service mode

When you go out of SERVICE MODE, the selected values are stored.

User adjustment of sound and picture is possible with Beolink 1000 in SERVICE MODE.

A standard colour test pattern is used for the following adjustments.

Preset

Preset-justering (referenceniveau) af lys og farvemætning.

- Indstil lys og farvemætning til nominelle værdier **[RESET]** eller **[SHIFT]** **[MUTE]** Beolink 1000 MK III.
- Sæt TV'et i SERVICEMODE.
- Juster lys (BRI) til korrekt lysindhold i billedet (typisk 3).
- Juster farvemætning (COL) til korrekt farvemætning (typisk 4).

Cut-off balance

- Indstil lys til nominal værdi, **[RESET]** eller **[SHIFT]** **[MUTE]** Beolink 1000 MK III.
- Indstil farvemætning til '0'.
- Sæt TV'et i SERVICEMODE.
- Juster rød og grøn cut-off balance (Rcu) og (Gcu) til de mørke felter i testbilledet er farveløse.

Drive

- Indstil lys til nominal værdi, **[RESET]** eller **[SHIFT]** **[MUTE]** Beolink 1000 MK III.
- Indstil farvemætning til '0'.
- Sæt TV'et i SERVICEMODE.
- Juster rød og grøn drive (Rdr) og (Gdr) til korrekt hvidpunkt.

HORIZONTAL AFBØJNING

Hor. frekvens

- Kortslut ben 5 på 13IC1 til stel.
- Vælg Hfq i SERVICEMODE.
- Juster hor. frekvens til langsomst horisontal billedrul.
- Fjern kortslutningen.

Øst/Vest parabel

- Vælg EWp i SERVICEMODE.
- Juster til korrekt geometri i siderne.

Øst/Vest tilt

- Vælg EWt i SERVICEMODE.
- Juster til korrekt geometri (vert. centrering påvirkes).

Øst/Vest corner

- Vælg EWc i SERVICEMODE.
- Juster til korrekt geometri i hjørnerne.

Hor. amplitude

- Vælg Ham i SERVICEMODE.
- Juster til korrekt amplitude.

Preset

Preset adjustment (reference level) of brilliance and colour saturation.

- Set the brilliance and colour saturation to nominal values, **[RESET]** or **[SHIFT]** **[MUTE]** Beolink 1000 MK III.
- Bring the TV set into SERVICE MODE.
- Adjust the brilliance (BRI) until the picture has the proper brilliance (typically 3).
- Adjust the colour saturation (COL) to the proper colour saturation (typically 4).

Cut-off balance

- Set the brilliance to the nominal value, **[RESET]** or **[SHIFT]** **[MUTE]** Beolink 1000 MK III.
- Set the colour saturation to '0'.
- Bring the TV set into SERVICE MODE.
- Adjust the red and green cut-off balance (Rcu) and (Gcu) until the dark fields in the test pattern are colourless.

Drive

- Set the brilliance to the nominal value, **[RESET]** or **[SHIFT]** **[MUTE]** Beolink 1000 MK III.
- Set the colour saturation to '0'.
- Bring the TV set into SERVICE MODE.
- Adjust the red and green drive (Rdr) and (Gdr) to the proper white level.

HORIZONTAL DEFLECTION

Horizontal frequency

- Short-circuit pin 5 of 13IC1 to ground.
- Select Hfq in SERVICE MODE.
- Adjust the horizontal frequency to the slowest possible picture roll.
- Remove the short circuit.

East/West parabola

- Select EWp in SERVICE MODE.
- Adjust to correct geometry at the sides.

East/West tilt

- Select EWt in SERVICE MODE.
- Adjust to correct geometry (vertical centring is affected).

East/West corner

- Select EWc in SERVICE MODE.
- Adjust to correct geometry in the corners.

Horizontal amplitude

- Select Ham in SERVICE MODE.
- Adjust to correct amplitude.

Hor. centrering/'phase'

- Indstil lys (BRILLIANCE) til maksimum.
- Vælg Ham i SERVICEMODE og juster til minimum bredde.
- Vælg Hph og centrér billedet så det ligger indenfor scan-tiden.
- Vælg Ham og juster til korrekt bredde.
- Centrér billedet bedst muligt med 3S1.
- Vælg Hph og efterjuster.
- Tryk **RESET** eller **SHIFT** **MUTE** (Beolink 1000 MK III) for at justere BRILLIANCE til nominal.

VERTIKAL AFBØJNING

Vert. amplitude

- Vælg Vam i SERVICEMODE.
- Juster til korrekt amplitude.

Vert. linearitet

- Vælg Vli i SERVICEMODE.
- Juster til korrekt linearitet.

Vert. S-korrektion

- Vælg Vsc i SERVICEMODE.
- Juster til korrekt geometri (øst/vest corner påvirkes).

Vert. centrering

- Vælg Vsh i SERVICEMODE.
- Juster til korrekt centrering (øst/vest tilt påvirkes).

Gentag evt. justeringsproceduren.

Horizontal centring/'phase'

- Set the BRILLIANCE to the maximum value.
- Select Ham in SERVICE MODE and adjust to minimum width.
- Select Hph and centre the picture such that it is within the scanning period.
- Select Ham and adjust to correct width.
- Centre the picture optimally by means of 3S1.
- Select Hph and readjust.
- Press **RESET** or **SHIFT** **MUTE** (Beolink 1000 MK III) to adjust the BRILLIANCE to its nominal value.

VERTICAL DEFLECTION

Vertical amplitude

- Select Vam in SERVICE MODE.
- Adjust to correct amplitude.

Vertical linearity

- Select Vli in SERVICE MODE.
- Adjust to correct linearity.

Vertical S-correction

- Select Vsc in SERVICE MODE.
- Adjust to correct geometry (East/West corner is affected).

Vertical centring

- Select Vsh in SERVICE MODE.
- Adjust to correct centring (East/West tilt is affected).

Repeat the adjustment procedure if required.

JUSTERINGSVEJLEDNING

Under de efterfølgende justeringer skal modtageren være tilsluttet et normalt farvetestbillede, hvis andet ikke er nævnt.

Servicejusteringer med terminal skal være foretaget.

Modul 2/12 PAL/SECAM/NTSC dekoder

Fokus

- Indstil lys og farvemætning til nominelle værdier, **RESET** eller **SHIFT** **MUTE** Beolink 1000 MK III.
- Indstil kontrasten til maksimum.
- Juster til optimal focusering set ca. 10 cm fra skærmkanten, med focuspotentiometeret på modul 3.

4,43 MHz cromasug

- Tilslut et PAL testbillede (farvebar)
- Slut et oscilloskop til 2/12J10 (koordinat 2C) eller emitter på 2/12TR11 (koordinat 2D).
- Juster 2/12L1 (koordinat 1D) til minimum 4,43 MHz-rest i signalet.

PLL ref. osc

- Tilslut et PAL testbillede (farvebar).
- Kortslet 2/12J6 og 2/12J7 (koordinat 2B).
- Juster 2/12C48 (koordinat 1C) til minimum farverul i farvebaren.

Hvis der er monteret PAL/NTSC B/G/M MF i TV'et, skal 2C46 også justeres.

- Juster 2C46 (koordinat 1C) på samme måde som 2C48. TV'et skal blot være tilsluttet et NTSC M testbillede.

Cloche filter

- Tilslut et SECAM testbillede (farvebar).
- Juster 2L22 (koordinat 2C) til bedst mulig farveovergange i farvebaren.

Secam sort niveau

- Tilslut et SECAM farvetestbillede med sort indhold.
- Slut et oscilloskop til ben 1 på 2IC1.
- Juster 2R65 (koordinat 1B) til DC niveauet på signalet har samme DC niveau som blanking (sort niveau).
- Slut et oscilloskop til ben 3 på 2IC1.
- Juster 2L25 (koordinat 1B) til DC niveauet på signalet har samme DC niveau som blanking (sort niveau).
- Gentag justeringen.

ADJUSTMENT GUIDE

A standard colour test pattern must be connected when making the following adjustments unless otherwise specified.

Service adjustments with the remote control terminal must have been made in advance.

Module 2/12 PAL/SECAM/NTSC decoder

Focus

- Set the brilliance and colour saturation to their nominal values, **RESET** or **SHIFT** **MUTE** Beolink 1000 MK III.
- Set the contrast to the maximum value.
- Adjust to optimum focusing as viewed approx. 10 cm from the edge of the screen by means of the focus potentiometer on module 3.

4.43 MHz chroma trap

- Connect a PAL test pattern (colour bar).
- Connect an oscilloscope to 2/12J10 (coordinate 2C) or the emitter of 2/12TR11 (coordinate 2D).
- Adjust 2/12L1 (coordinate 1D) to obtain the minimum 4.43 MHz residue in the signal.

PLL ref. osc

- Connect a PAL test pattern (colour bar).
- Short-circuit 2/12J6 and 2/12J7 (coordinate 2B).
- Adjust 12C48 (coordinate 1C) to obtain the minimum colour roll in the colour bar.

If a PAL/NTSC B/G/M IF is installed in the TV set, 2C46 has to be adjusted, too.

- Adjust 2C46 (coordinate 1C) in the same way as 2C48. Only an NTSC M test pattern has to be connected to the TV set.

Cloche filter

- Connect a SECAM test pattern (colour bar).
- Adjust 2L22 (coordinate 2C) until the optimum colour graduations in the colour bar are achieved.

SECAM black level

- Connect a SECAM test pattern with black content.
- Connect an oscilloscope to pin 1 of 2IC1.
- Adjust 2R65 (coordinate 1B) until the DC level of the signal has the same DC level as blanking (black level).
- Connect an oscilloscope to pin 3 of 2IC1.
- Adjust 2L25 (coordinate 1B) until the DC level of the signal has the same DC level as blanking (black level).
- Repeat the adjustment.

Cut-off

- Indstil lys til nominel værdi, **[RESET]** eller **[SHIFT]** **[MUTE]** Beolink 1000 MK III.
- Tast **[PICTURE]** **[MUTE]**.
- Mål med et DC voltmeter ($R_i > 1\text{M}\Omega$) spændingsfaldet over 3R1, 3R2 og 3R3.
- Juster med G2-potentiometeret (modul 3), indtil der er 20V over den af 3R1, 3R2 eller 3R3, der har det mindste spændingsfald.
- Tast **[PICTURE]** **[MUTE]** efter justeringen.

Modul 1/38 Tuner & IF**AFC**

Justeres kun hvis 1/38IC4 udskiftes.

- Kortslut 1/38R100 (koordinat 5F).
- Kortslut 1/38L13 (koordinat 3A).
- Slut et DC voltmeter til ben 5 på 1/38IC4 (koordinat 3B), og juster 1/38L12 (koordinat 3B) til der måles 6V.
- Drej 1/38R204 (koordinat 3F) helt mod uret.
- Tilslut DC voltmeter mellem ben 3 og ben 6 på 1/38IC9 (koordinat 4E), og juster 1/38R196 (koordinat 5E) til der måles 0,6V.
- Slut et DC voltmeter til ben 3 på 1/38IC9 (koordinat 4E), og juster 1/38R204 (koordinat 3F) til der måles 6,3V.
- Fjern kortslutningerne over 1/38R100 og 1/38L13.

Video carrier 38,9 MHz

Justeres kun hvis 1/38IC3 udskiftes.

- Slut et oscilloskop til ben 8 på 1/38IC3 (koordinat 3C).
- Juster 1/38L11 (koordinat 3C) til forreces på linesynkspulsen er så vandret som muligt.

Stop tuning

Justeres kun hvis 1/38IC12 udskiftes.

- Fjern antennesignalet fra tuner.
- Tilslut frekvenstæller til ben 5 på 1/38IC12 (koordinat 2A).
- Juster 1/38R99 (koordinat 2A) til der måles 15625 Hz.

AGC

Justeres kun hvis 1/38IC3 udskiftes.

- Tilslut et antennesignal B/G eller I.
- Drej 1/38R56 (koordinat 4D) helt med uret, derefter drejes der mod uret til billedet netop er støjfrit.

Video output

- Slut et oscilloskop til emitteren på 1/38TR17 (koordinat 2C).
- Juster 1/38R167 (koordinat 2C) til der måles 2Vpp.

Cut-off

- Set the brilliance to the nominal value, **[RESET]** or **[SHIFT]** **[MUTE]** Beolink 1000 MK III.
- Press **[PICTURE]** **[MUTE]**.
- Use a voltmeter ($R_i > 1\text{M}\Omega$) for measuring the voltage drop across 3R1, 3R2 and 3R3.
- Adjust by means of the G2 potentiometer (module 3) until there is a voltage of 20V across that resistor, 3R1, 3R2 or 3R3, which has the smallest voltage drop.
- Press **[PICTURE]** **[MUTE]** after completing the adjustment.

Module 1/38 Tuner & IF**AFC**

To be adjusted only if 1/38IC4 is replaced.

- Short-circuit 1/38R100 (coordinate 5F).
- Short-circuit 1/38L13 (coordinate 3A).
- Connect a DC voltmeter to pin 5 of 1/38IC4 (coordinate 3B) and adjust 1/38L12 (coordinate 3B) until 6V is measured.
- Turn 1/38R204 (coordinate 3F) fully anticlockwise.
- Connect a DC voltmeter between pin 3 and pin 6 of 1/38IC9 (coordinate 4E) and adjust 1/38R196 (coordinate 5E) until 0.6V is measured.
- Connect a DC voltmeter to pin 3 of 1/38IC9 (coordinate 4E) and adjust 1/38R204 (coordinate 3F) until 6.3V is measured.
- Remove the short circuits across 1/38R100 and 1/38L13.

Video carrier 38.9 MHz

To be adjusted only if 1/38IC3 is replaced.

- Connect an oscilloscope to pin 8 of 1/38IC3 (coordinate 3C).
- Adjust 1/38L11 (coordinate 3C) until the front porch of the line sync pulse is as horizontal as possible.

Stop tuning

To be adjusted only if 1/38IC12 is replaced.

- Remove the aerial signal from the tuner.
- Connect a frequency counter to pin 5 of 1/38IC12 (coordinate 2A).
- Adjust 1/38R99 (coordinate 2A) until 15625 Hz is measured.

AGC

To be adjusted only if 1/38IC3 is replaced.

- Connect an aerial signal B/G or I.
- Turn 1/38R56 (coordinate 4D) fully clockwise, then turn it anticlockwise until the picture is just free of noise.

Video output

- Connect an oscilloscope to the emitter of 1/38TR17 (coordinate 2C).
- Adjust 1/38R167 (coordinate 2C) until 2Vpp is measured.

Sound mixer

Justeres kun hvis 1/38IC3 udskiftes.

- Slut et oscilloskop til ben 5 på 1/38IC3 (koordinat 3C) ($x = 1\mu s$).
- Juster 1/38L9 (koordinat 3C) indtil top og bund af signalet er så parallelle som muligt.

Kanalseparation

- Tilslut et antennesignal med A2 stereo lydmodulation.
- Slut et oscilloskop til ben 14 på 1/38IC2 (koordinat 1C).
- Juster 1/38R17 (koordinat 1C) til minimal overhøring.

NICAM system B/G og I

- Tilslut et NICAM antennesignal B/G eller I.
- Tilslut et oscilloskop, der kan lave x-y afbøjning til 8L1 og 8L2 på den side der vender ind mod 8C59 (koordinat 1A).
- Juster 8C34 (koordinat 1B) indtil oscilloskopbilledet herunder er opnået. (VCO frekvensen er 5,85MHz for system B/G og 6,552MHz for system I).



$x = y = 0,2 \text{ V/DIV}$

Sound mixer

To be adjusted only if 1/38IC3 is replaced.

- Connect an oscilloscope to pin 5 of 1/38IC3 (coordinate 3C) ($x = 1\mu s$).
- Adjust 1/38L9 (coordinate 3C) until the top and bottom of the signal are as parallel as possible.

Channel separation

- Connect an aerial signal with A2 stereo sound modulation.
- Connect an oscilloscope to pin 14 of 1/38IC2 (coordinate 1C).
- Adjust 1/38R17 (coordinate 1C) to minimum crosstalk.

NICAM systems B/G and I

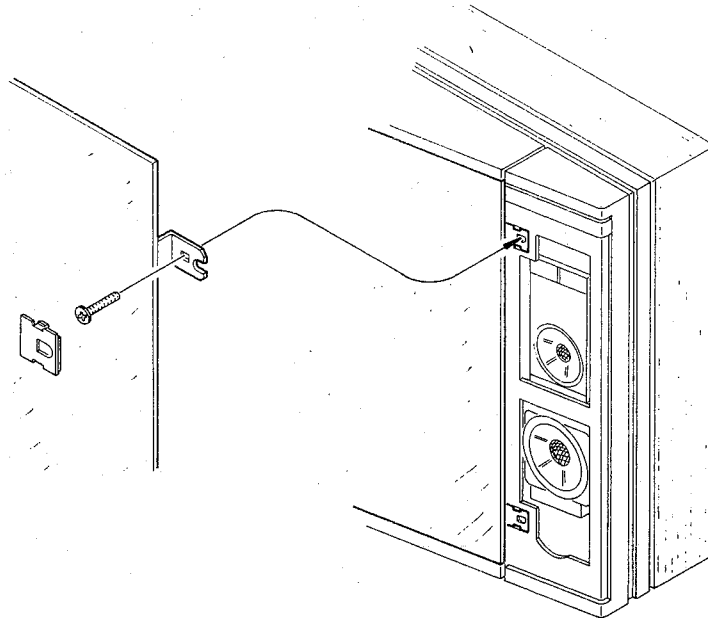
- Connect a NICAM aerial signal B/G or I.
- Connect an oscilloscope that is able to produce an x-y deflection to 8L1 and 8L2 on the side facing towards 8C59 (coordinate 1A).
- Adjust 8C34 (coordinate 1B) until the oscilloscope image shown below has been achieved. (The VCO frequency is 5.85 MHz for system B/G and 6.552 MHz for system I).



$x = y = 0.2 \text{ V/DIV}$

ADSKILLELSE
LX5000/6000
Kontrastskærm

DISASSEMBLY
LX5000/6000
Contrast screen



Rammen med højttalerstof fjernes ved først at trække forsigtigt ud for neden, dernæst i midten og til sidst foroven.

De fire dæksler, to i hver side, aftages med en lille flad skruetrækker.

Skruerne som holder skærmen er nu tilgængelige.

Afmonter de to nederste skruer og *kun* en foroven.

Hold godt fast på skærmen medens den sidste skrue fjernes.

Remove frame with loudspeaker cloth by first pulling carefully from the bottom, then in the middle and finally from the top.

Remove the four caps, two in each side, using a small flat screw driver.

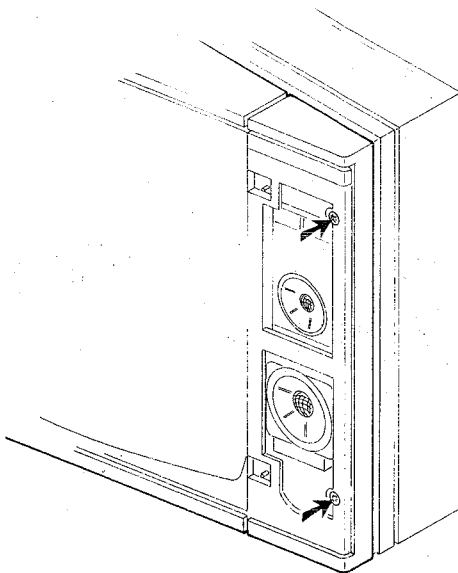
The screws which hold the screen are now accessible.

Remove the two bottom screws and *one* from the top.

Hold tightly on to the screen while removing the last screw.

Frontramme
(Adgang til IR modtager)

Front frame
(Access to IR receiver)



Kontrastskærmen afmonteres.

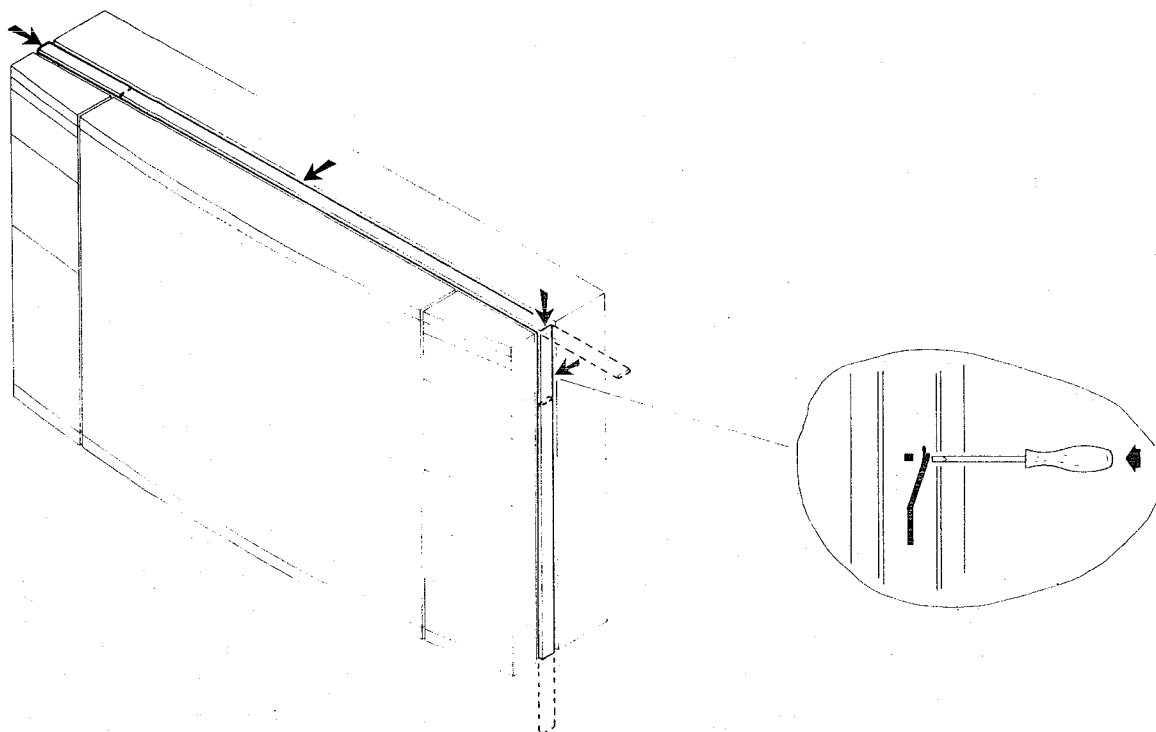
Remove the contrast screen.

De to viste skruer og de to tilsvarende i den anden side skrues af, og frontrammen kan aftages.

Unscrew the two screws illustrated as well the two corresponding screws in the other side, and take of the front frame.

Topliste/Sideliste

Top list/Side list



Sidelisterne løsnes ved at udløse låsen med en smal skrueetrækker.

Loosen side lists by releasing lock using a small screwdriver.

Når låsen er udløst kan sidelisten skubbes ned.

Now the side list may be pushed down.

Toplisten løsnes som sidelisterne.

Loosen top list like the side lists.

Toplisten skubbes mod højre.

Push top list towards the right.

ADSKILLELSE

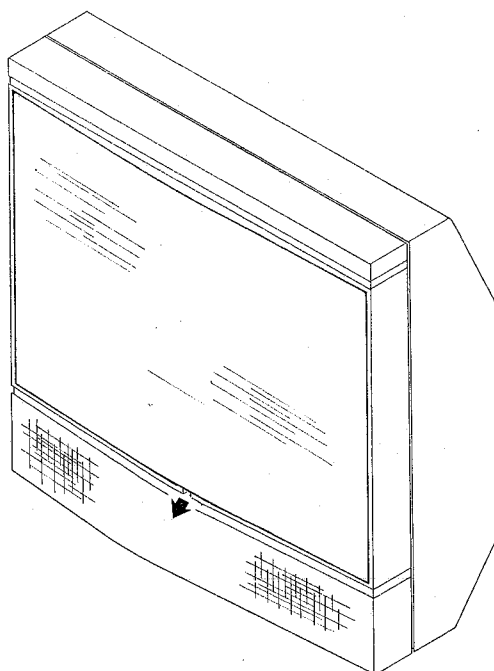
MX4000

Demontering af kontrastskærmen

DISASSEMBLY

MX4000

Removal of contrast screen

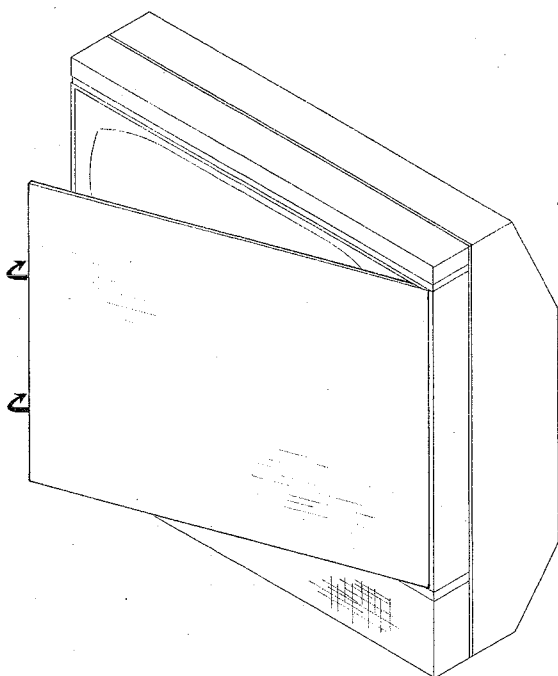


Træk ud i kontrastskærmens nederste kant.

Pull the lower edge of the contrast screen outwards.

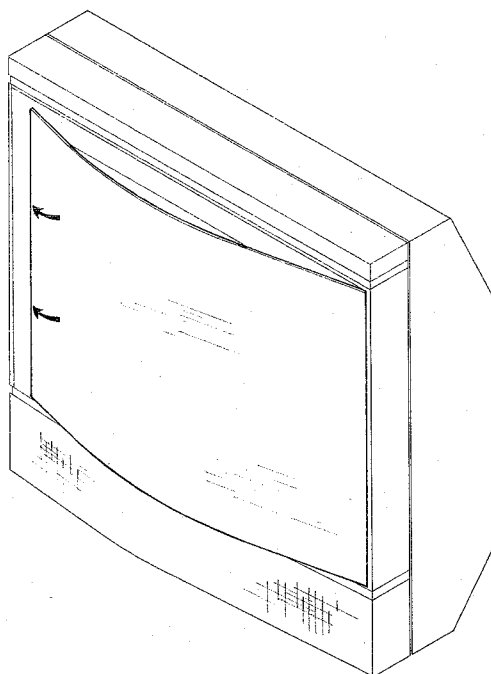
Montering af kontrastskærmen

Mounting of contrast screen



Monter skærmen i rillen af det ene sidepanel.

Bøj skærmen frem og monter skærmen i rillen af det modsatte sidepanel.

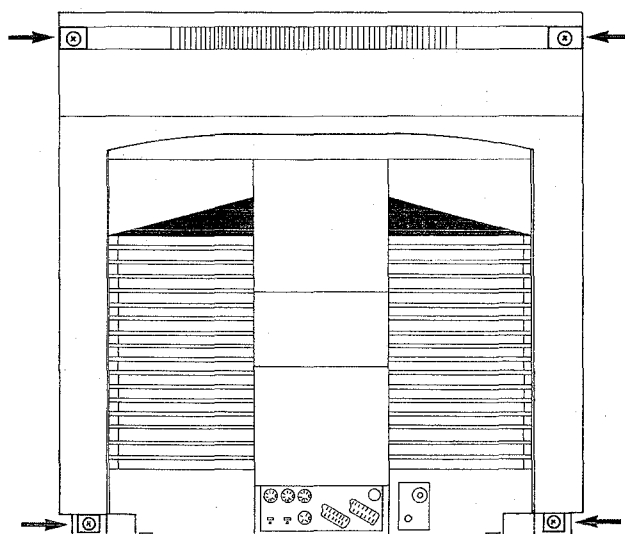


Fit the screen into the groove in one of the side panels.

Flex the screen slightly outwards and fit the screen into the groove in the opposite side panel.

Bagpart

Rear part

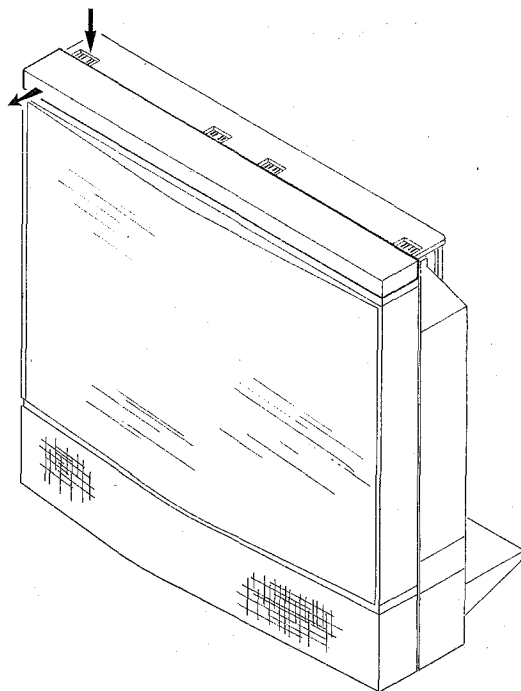


De fire skruer løsnes, og bagparten trækkes lige bagud.

Loosen the 4 screws and then remove the rear part by pulling straight outwards.

Toppanel

Top panel



Panelet løsnes i den ene side, ved at låsen aktiveres med en skruetrækker.

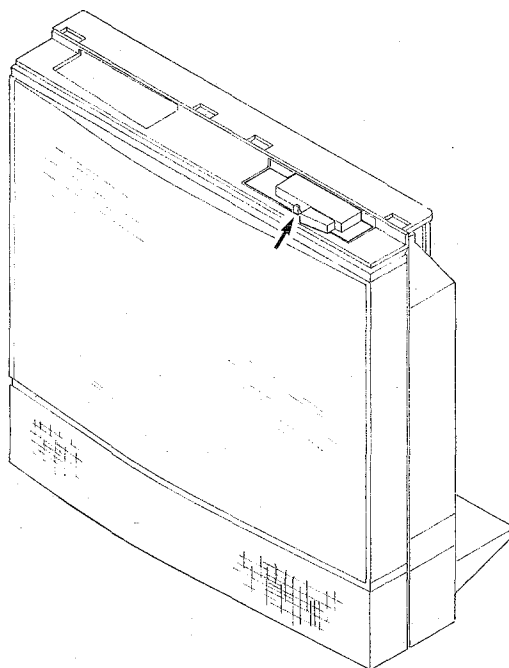
Loosen the panel in one side by releasing the lock with a screwdriver.

Toppanelet kan nu fjernes.

The top panel can now be removed.

PCB 9 IR Transceiver

PCB 9 IR Transceiver

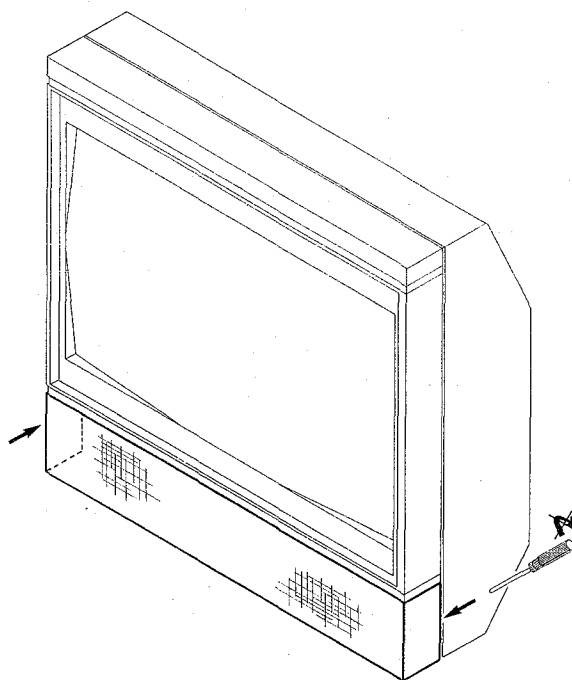


Låsen løsnes og PCB'en tages ud, ved at løfte i den forreste kant.

Release the lock and remove the PCB by lifting it at its front.

Højtalerpanel

Loudspeaker panel



En skruetrækker sættes forsigtigt ind mellem højtalerpanelet og kabinettet i apparatets højre side.

Højtalerpanelet løsnes med et let tryk med skruetrækkeren og skubbes dernæst mod venstre.

Med et let tryk mod højtalerpanelets venstre hjørne frigøres panelet fuldstændig.

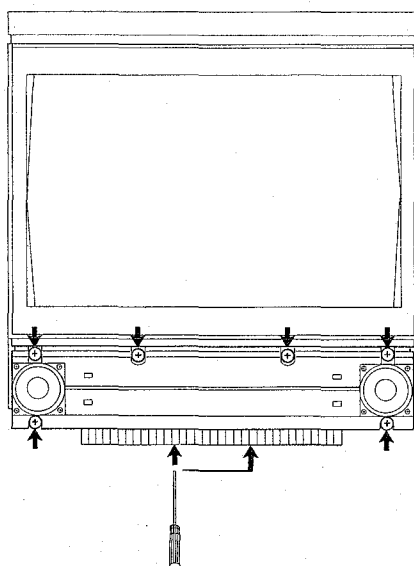
Carefully insert a screwdriver between the loudspeaker panel and the cabinet in the right-hand side of the set.

Loosen the loudspeaker panel by exerting a light pressure with the screwdriver. Push the loudspeaker panel towards the left.

A light push against the left corner of the loudspeaker panel will now release the panel completely.

Højtalerbaffel

Loudspeaker baffle



De seks skruer fjernes.

Højtalerbafflen løsnes, ved at de to låse i bunden af apparatet aktiveres, hvorefter bafflen trækkes fremad og opad.

Remove the 6 screws.

Loosen the loudspeaker baffle by using a screwdriver to release the 2 locks at the base of the set. Then pull the baffle outwards and upwards.

ADSKILLELSE

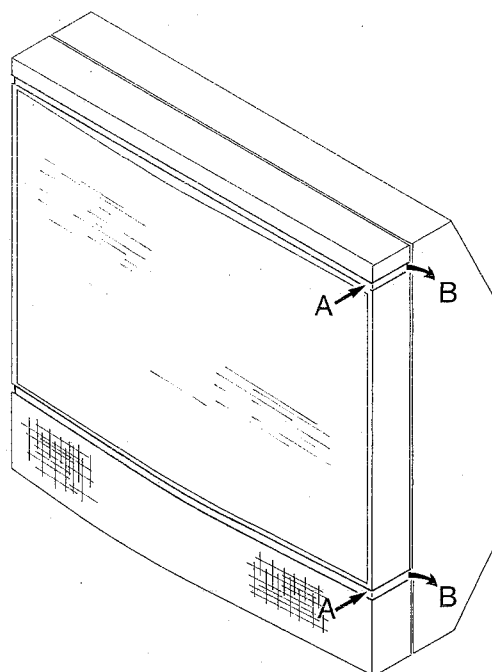
MX6000

Demontering af kontrastskærmen

DISASSEMBLY

MX6000

Removal of contrast screen



Pyntelisterne over og under kontrastskærmen løsnes ved at trykke listen ind (A) og samtidig trække ud i pilen B's retning. Listerne kan nu frigøres hele vejen rundt.

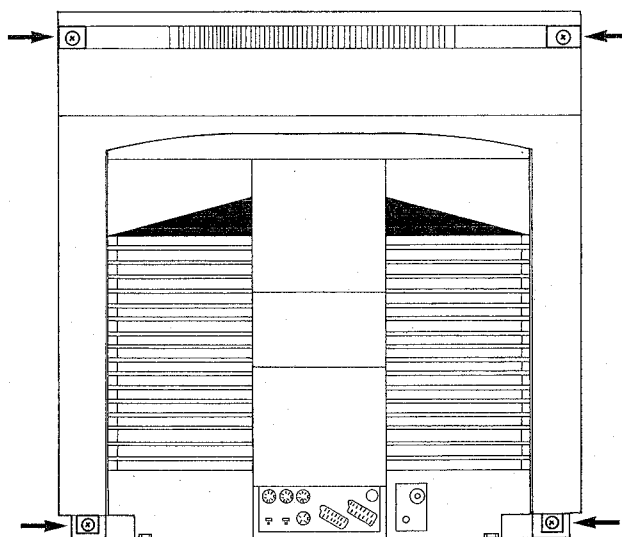
I hvert af de fire hjørner sidder en skrue som skrues ud, hvorefter kontrastskærmen er fri.

Loosen the upper and lower plastic strips by firmly pressing the strips in one side (A) and simultaneously pulling at the end of the strips in the direction of the arrow B. The strips are now loose and can be removed.

Loosen the screw in each of the four corners. The contrast screen can now be removed.

Bagpart

Rear part

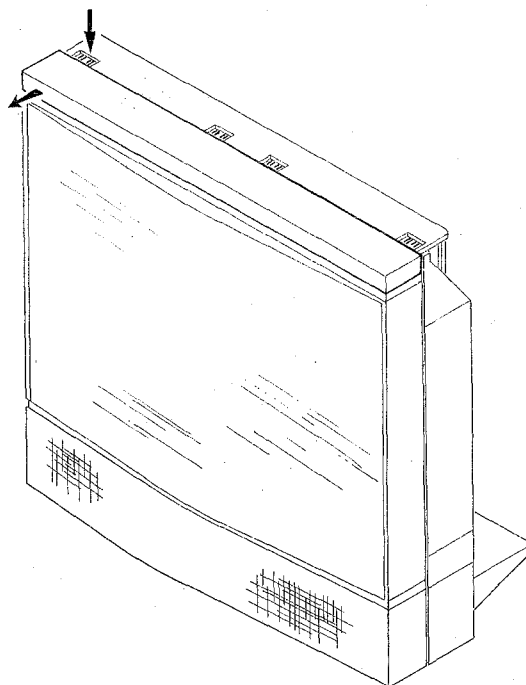


De fire skruer løsnes, og bagparten trækkes lige bagud.

Loosen the four screws and then remove the rear part by pulling straight outwards.

Toppanel

Top panel



Panelet løsnes i den ene side, ved at låsen aktiveres med en skruetrækker.

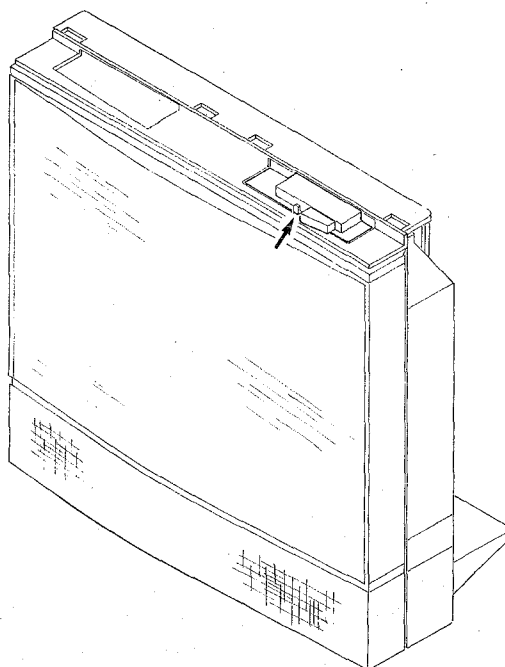
Loosen the panel in one side by releasing the lock with a screwdriver.

Toppanelet kan nu fjernes.

The top panel can now be removed.

PCB 9 IR Transceiver

PCB 9 IR Transceiver

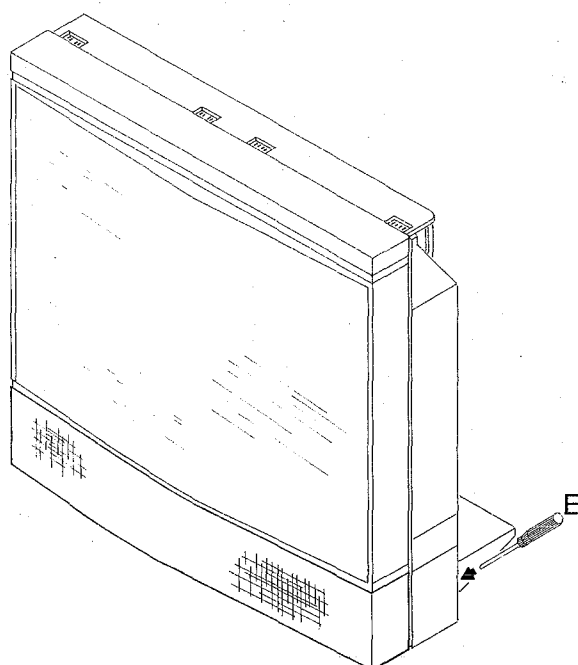


Låsen løsnes og PCB'en tages ud, ved at løfte i den forreste kant.

Release the lock and remove the PCB by lifting it at its front.

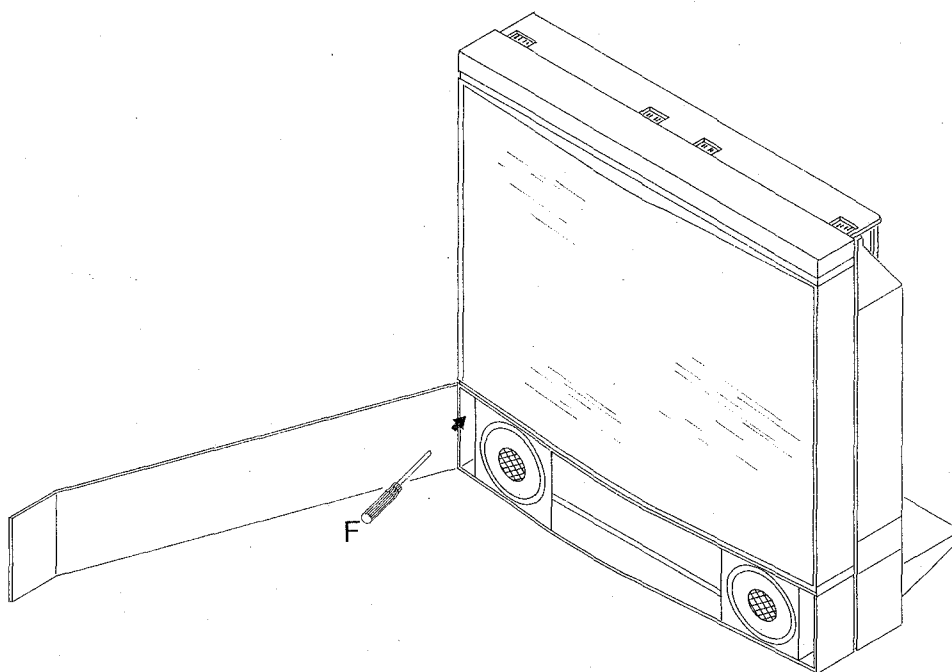
Højttalerpanel

Loudspeaker panel



Panelet frigøres i venstre side (set bagfra) ved at løsne låsene med en skruetrækker igennem hullerne i kabinettet (E). Herefter trækkes panelet fri langs kanten.

Loosen the panel in the left-hand side (seen from behind) by inserting a screwdriver into the holes in the cabinet (E) to release the locks. Loosen the panel at the front of the set.



Panelet frigøres i den anden side ved at løsne låsene forfra med en skruetrækker mellem panelet og kabinettet (F).

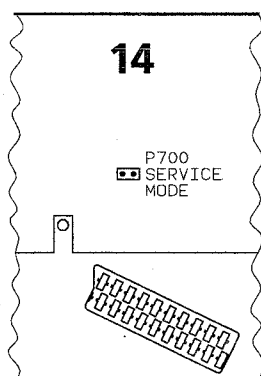
To detach the panel in the opposite side, release the locks by inserting a screwdriver between the panel and the cabinet (F).

REPARATIONSTIPS

Service mode

Bring TV'et i SERVICEMODE:

- fjern bagparten
- tast **TV**
- kortslut SERVICEMODE-stikket P700 på PCB14 kortvarigt.



Service mode giver mulighed for:
Billed- og geometrijusteringer, se afsnittet SERVICEJUSTERINGER MED BEOLINK 1000.

Udlæsning af apparatets type- og serienummer

4200	00000001	Last error no
Type nummer	Serie nummer	Sidste fejltilstand

Billedrør

Der anvendes 2 forskellige billedrørstyper i TV'et, en Philips type og en Videocolour type.
De 2 billedrørstyper kræver forskellig billed mute tid under opstart.
Philips 7-8 sekunder.
Videocolour 11-12 sekunder.

7-8 eller 11-12 sekunder kan vælges i SERVICE-MODE:

- Vælg Rdr i SERVICEMODE med **◀** eller **▶**.
- Tast **8** for 7-8 sekunder (Philips).
- Tast **9** for 11-12 sekunder (Videocolour).

Som kvittering for at kommandoen er modtaget, går TV'et ud af SERVICEMODE.

Last error

Giver mulighed for udlæsning en evt. sidste fejltilstand.

TV'et er forsynet med en række sikringskredsløb, der træder i kraft ved fejl i apparatet og beskytter apparatet mod følgeskader.

Følgende tre fejltyper overvåges.

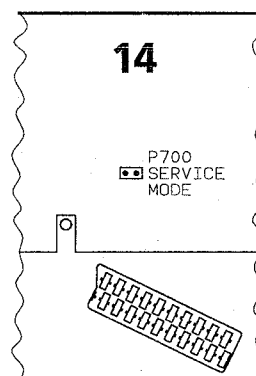
- Power fail (f.eks. overbelastning af en forsyningsspænding).
- I²C-bus fejl
- Fejl i EEPROM

REPAIR TIPS

Service mode

Bring the TV set into SERVICE MODE:

- remove the rear panel
- press **TV**
- short-circuit the SERVICE MODE plug, P700, on PCB14 briefly.



The service mode gives access to the following:
Picture and geometry adjustments, see the section SERVICE ADJUSTMENTS WITH BEOLINK 1000.

Display of the type and serial numbers of the TV set

4200	00000001	Last error no
Type number	Serial number	Last error condition

Picture tube

Two types of picture tubes are used in the TV, a Philips and a Videocolour type.
The two types require different picture mute time during start-up.
Philips 7-8 seconds.
Videocolour 11-12 seconds.

7-8 or 11-12 seconds can be selected in SERVICE-MODE:

- Select Rdr in SERVICEMODE using **◀** or **▶**.
- Press **8** for 7-8 seconds (Philips).
- Press **9** for 11-12 seconds (Videocolour).

As a sign of receipt of the command the TV leaves SERVICEMODE.

Last error

Permits the display of any last error condition.

The TV set is equipped with a number of safety circuits which become active in the event of an error occurring in the TV set and protect the set against damage as a consequence of such an error.

The following three error types are monitored:

- Power fail (e.g. overloading of a supply voltage).
- I²C bus error.
- Error in EEPROM.

Udlæsning

Last error no = ingen fejl registreret.

Last error pf = power fail.

Last error 00 til og med FF = fejl et sted på I²C-bussen.

Last error df = data failure (EEPROM 61C6 evt. defekt).

Power fail kredsløbet er et ringkoblet system, der detekterer om en eller flere spændingsstabiliseringer er overbelastede. I givet fald registreres dette af µC'en, der bringer apparatet i stand-by.

Kredsløbet fungerer ved, at µC'en 61C2 sender en pulserende spænding ud på ben 10.

Hvis der ikke er fejl, modtager µC'en signalet igen på ben 12 61C4.

Hvis der opstår en overbelastning, clamper den overbelastede forsyning signalet, og der kommer ikke noget retur til ben 12.

Det samme signal styrer desuden netdelen ON via 4C62, 4R84 og 4TR19.

Hvis der opstår en fejl så netdelen ikke får tilført den pulserende spænding, går netdelen automatisk i stand-by.

Ved opstart ignoreres power fail retur meldingen i 400mS for at de forskellige spændingsstabiliseringer kan nå at regulere på plads. I de 400mS kan man evt. måle hvor den pulserende spænding bliver belastet i power fail systemet (se power fail diagram side 2-20).

I²C-bus fejlsystemet er en del af softwaren, der registrerer kommunikationsfejl mellem µC'en og de komponenter, der styres via I²C-bussen.

Hvis der opstår en sådan fejl, bringer µC'en apparatet i stand-by.

Hvis der opstår fejl i EEPROM (61C6), så det ikke er muligt at overføre apparatets grundindstillinger til afbøjningsdelen og farvedelen, erstatter µC'en de manglende data med standardværdier, der er gemt i programlageret.

Opstart med ignorering af fejl:

Ved power fail eller I²C-bus fejl, hvor TV'et går i stand-by hver gang det forsøges startet, er det muligt at starte TV'et op i en tilstand hvor fejlen ignoreres.

Fremgangsmåden er som følger:

- TV'et skal være i stand-by.
- Kortslut SERVICEMODE-stikket P700 på PCB14, kortslutningen skal være konstant.
- Hvis TV'ets stand-by/ON LED lyser orange er fejlen en power fail. Lyser LED'en rød er der tale om en data failure eller I²C-bus fejl.
- Tryk ☐ TV ☐. LED'en lyser nu grøn.

Display

Last error no = no error registered.

Last error pf = power fail.

Last error 00 up to and including FF = error somewhere on the I²C bus.

Last error df = data failure (EEPROM 61C6 perhaps defective).

The power fail circuit is a ring coupled system that detects whether or not one or several voltage stabilizations are overloaded. If that is the case, this is registered by the µC, which brings the TV set into stand-by.

The circuit operates as follows:

The µC, 61C2, outputs a pulsating voltage at pin 10.

If there are no errors, the µC receives the signal back again at pin 12 61C4.

If an overload condition occurs, the overloaded supply clamps the signal, and no signal is returned to pin 12.

The same signal, via 4C62, 4R84 and 4TR19, further causes the power-supply unit to switch ON.

If an error occurs such that the power-supply unit does not receive the pulsating voltage, the power-supply unit automatically goes into stand-by.

At power-up, the power fail return information is ignored for 400mS in order that the various power stabilizations may have time to adjust. During the 400mS period it is possible to measure e.g. where the pulsating voltage is loaded in the power fail system (see the power fail diagram on page 2-20).

The I²C bus error system is integrated in the software that registers communication errors between the µC and the components which are controlled through the I²C bus.

If such an error occurs, the µC brings the TV set into stand-by.

If an error occurs in the EEPROM (61C6), such that it is not possible to transfer the basic settings of the TV set to the deflection section and the colour section, the µC replaces the missing data with standard values stored in the program memory.

Power-up with errors being ignored:

If a power fail or an I²C bus error occur, which make the TV set go into stand-by every time it is attempted to be started, it is possible to start up the TV set in a mode in which the error is ignored.

The procedure is as follows:

- The TV set must be in stand-by.
- Short-circuit the SERVICE MODE plug, P700, on PCB14; the short circuit must be constant.
- If the stand-by/ON LED on the TV set emits orange light, the error is a power fail. If the LED emits red light, the error in question is a data failure or an I²C bus error.
- Press ☐ TV ☐. The LED will now emit green light.



- Fjern kortslutningen på SERVICEMODE-stikket. TV'et starter nu op i SERVICEMODE, såfremt det er muligt.

TV'et er nu i SERVICEMODE, men power fail og I²C-bus fejl bliver ignoreret, indtil TV'et næste gang har været i stand-by.

VIGTIGT! Hvis TV'et startes op med ignorering af power fail kan det medføre store ødelæggelser i apparatet (stand-by/ON led lyser orange).

I²C-bus fejl

En I²C-bus fejl betyder, at kommunikationen på bussen svigtede, da µC'en forsøgte at kommunikere med den pågældende adresse. I de fleste tilfælde betyder det, at tilhørende komponent er defekt. Fejlen kan dog også skyldes en anden komponent, der ødelagde kommunikationen netop, som der blev kommunikeret med adressen, der står som Last error.

Adresser ved I²C-bus fejl:

Last error 4E 1/38IC6, Tuner & IF port expander.
84 1/38IC2, A2 stereo decoder.
40 8IC3, NICAM port expander.
42 2/12IC5, D/A converter til CUT-OFF og DRIVE
22 37IC2, Teletext controller.
8C 13IC2, Afbøjnings controller.
82 14IC1, Lyd controller.
86 14IC9, Video omskifter.

Efter reparation af en fejl, der har været angivet med en fejlmeddelelse, skal fejlmeddelelsen rettes til Last error no. Dette gøres ved at taste < eller > (▲ eller ▼).

Udlæsning af software versions nr:

TV'et skal ikke være i SERVICEMODE.

Tast TV MENU 0 0 PLAY eller
 TV SHIFT TEXT 0 0
 PLAY.

Fejlfinding i AFC kredsløb

Fejl i AFC kredsløbene på Tuner & IF PCB1/38 vil typisk medføre, at tuningssystemet søger ned i bunden eller op i toppen af tuningsområdet, eller TV'et vil ikke fange den rigtige frekvens, når man forsøger at tune til en frekvens.

Følgende retningslinier kan bruges ved fejlfinding:

- Tilslut antennesignal.
- Kortslut 1/38R100 (koordinat 5F).
- Kortslut 1/38L13 (koordinat 3A). AFC'en er nu inaktiveret.
- Tryk GOTO XXX for at tune til en frekvens.
- Tryk GOTO en gang til og kontroller at FINE TUNE står i midten.

- Remove the short circuit from the SERVICE MODE plug. The TV set will now start up in SERVICE MODE if that is possible.

The TV is now in SERVICE MODE but power fail and I²C bus errors will be ignored until the next time the TV has been in stand-by mode.

IMPORTANT! If the TV is started up ignoring the power fail error it may result in serious damage to the TV (the stand-by/ON LED emits orange light).

I²C bus error:

An I²C bus error means that the communication on the bus failed when the µC tried to communicate with the address in question. In most cases this means that the ancillary component is defective. However, the error may also be caused by a different component which destroyed the communication just when the communication was taking place with the address listed as the Last Error.

Addresses in connection with I²C bus errors:

Last error 4E 1/38IC6, Tuner & IF port expander.
84 1/38IC2, A2 stereo decoder.
40 8IC3, NICAM port expander.
42 2/12IC5, D/A converter for CUT-OFF and DRIVE.
22 37IC2, Teletext controller.
8C 13IC2, Deflection controller.
82 14IC1, Audio controller.
86 14IC9, Video controller.

After the repair of an error which has been listed as an error message in the error display, the error message must be corrected to read Last error no. This is accomplished by pressing < or > (▲ or ▼).

Display of the software version number:

The TV set should not be in SERVICE MODE.

Press TV MENU 0 0 PLAY or
 TV SHIFT TEXT 0 0
 PLAY.

Fault-finding in AFC circuits

Faults in the AFC circuits on Tuner & IF PCB1/38 will typically result in the tuning system searching down to the bottom or up to the top of the tuning range, or the TV will be unable to catch the right frequency when trying to tune in to a frequency.

The following guidelines may be employed in connection with fault-finding:

- Connect the aerial signal.
- Short-circuit 1/38R100 (coordinate 5F).
- Short-circuit 1/38L13 (coordinate 3A). The AFC has now been made inactive.
- Press GOTO XXX to tune in to a frequency.
- Press GOTO once more and check that FINE TUNE stands at the centre.

- Tilslut DC voltmetret til ben 5 på 1/38IC9 (koordinat 4E), spændingen på ben 5 skal være $6 \pm 0,3V$. Hvis spændingen ikke er rigtig, ligger fejlen i 1/38IC4 eller omliggende komponenter.
- Hvis de 6V på ben 5 er ok, tilslut DC voltmetret til ben 3 på 1/38IC9, spændingen på ben 3 skal være større end 6V.
- Tilslut DC voltmetret til ben 6 på 1/38IC9, spændingen på ben 6 skal være mindre end 6V.
- Hvis spændingerne på ben 3 og 6 ikke er ok, ligger fejlen i 1/38IC9, 1/38IC13 eller omliggende komponenter.

Fejlfinding i switch mode power supply

Ved fejl i switch mode power supply på PCB4, power supply & deflection, hvor f.eks. TR1, BUT 12 hele tiden bliver defekt, kan følgende retningslinier bruges ved fejlfinding:

- Afbryd netspændingen og tag chassiset ud.
- Kortslut basis-emitter på TR7 (R26), fig. 1.
- Lod en 1kohm modstand på midtpunktet for R24 og R25, fig. 1.
- Lod en 1kohm modstand på katoden af D16.
- Lod en ledning på anoden af D10 og slut ledningen til - bøsningen på en 5V DC strømforsyning, fig. 1.
- Lod en ledning på katoden af D12, lod den frie ende på de to 1kohm modstande fast på ledningen og slut ledningen til + bøsningen på en 5V DC strømforsyning, fig. 1.
- Slut midtpunktet på den balancerede $\pm 5V$ DC strømforsyning til J16 (stel), fig. 1 og tænd strømforsyningen.
- Slut et oscilloskop til punkterne ①, ②, ③ og ④, fig. 1 og 2.
- Når de målte pulser er som oscilloskopbillederne ①, ②, ③ og ④, fig. 1 og 2, er switch mode power supply i orden.

- Connect a DC voltmeter to pin 5 of 1/38IC9 (coordinate 4E). The voltage at pin 5 should be $6 \pm 0.3V$. If that voltage is not correct, the fault is in 1/38IC4 or the components surrounding it.
- If the 6V at pin 5 is OK, connect a DC voltmeter to pin 3 of 1/38IC9. The voltage at pin 3 should be greater than 6V.
- Connect a DC voltmeter to pin 6 of 1/38IC9. The voltage at pin 6 should be less than 6V.
- If the voltages at pins 3 and 6 are not OK, the fault is in 1/38IC9, 1/38IC13 or the surrounding components.

Fault-finding in switch mode power supply

If faults occur in the switch mode power supply on PCB4, power supply & deflection, e.g. if TR1, BUT 12 become defective all the time, the following guidelines may be employed in connection with the fault-finding process:

- Disconnect the mains voltage and take out the chassis.
- Short-circuit the base-emitter of TR7 (R26), fig. 1.
- Solder a 1 kohm resistor to the connection between R24 and R25, fig. 1.
- Solder a 1kohm resistor to the cathode of D16.
- Solder a lead to the anode of D10 and connect the lead to the - socket of a 5V DC power supply, fig. 1.
- Solder a lead to the cathode of D12, solder the free end of the two 1kohm resistors to the lead, and connect the lead to the + socket of the 5V DC power supply, fig. 1.
- Connect the mid-point of the balanced $\pm 5V$ DC power supply to J16 (ground), fig. 1, and switch on the power supply.
- Connect an oscilloscope to points ①, ②, ③ and ④, figs. 1 and 2.
- When the measured pulses are like the oscilloscope pictures ①, ②, ③ and ④, figs. 1 and 2, the switch mode power supply is in order.

Fig. 1

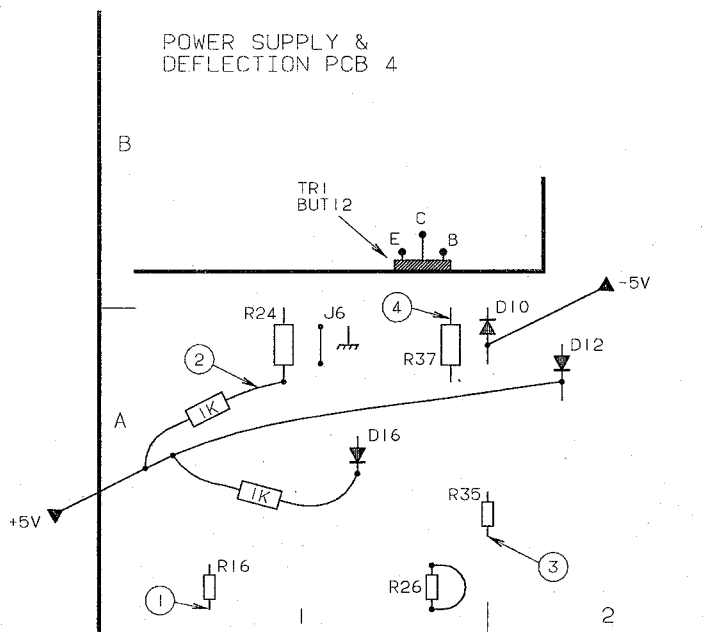
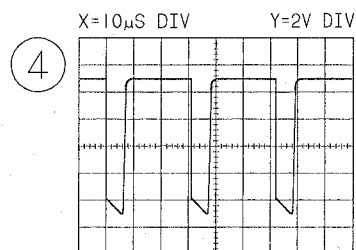
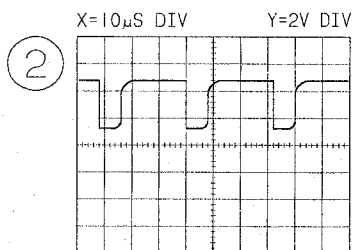
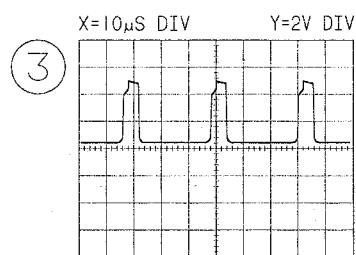
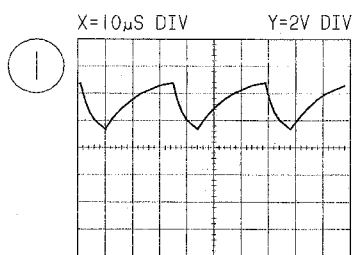
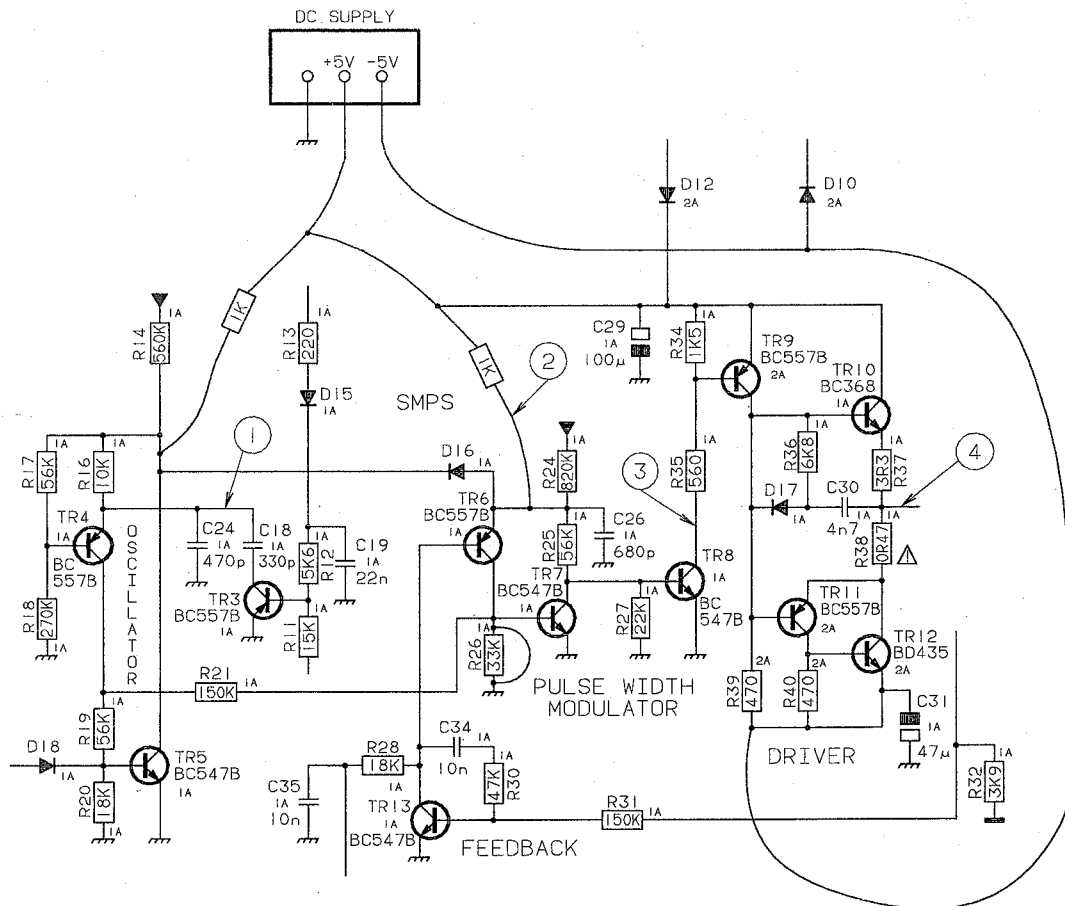


Fig. 2

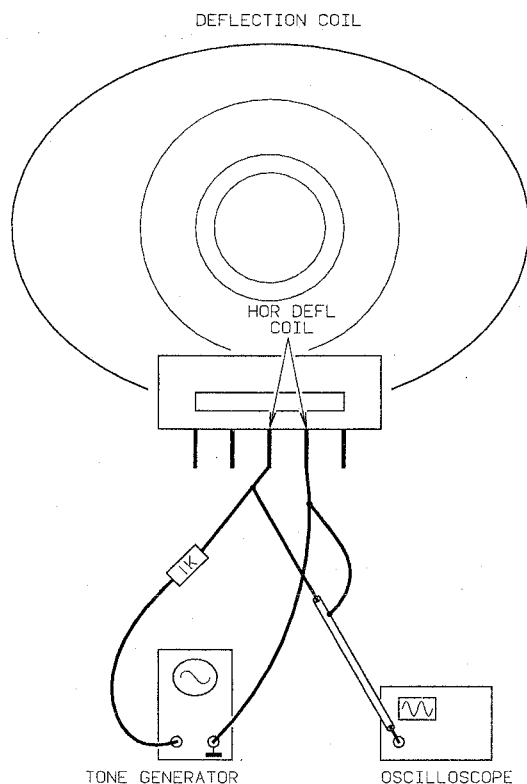


Retningslinier til fejlfinding i horisontal afbøjning

- TV'et må ikke være tilsluttet lysnettet.
- Tilslut en tonegenerator til den horisontale afbøjningsspole via en 1kohm modstand. Tonegeneratoren skal afgive et sinussignal på ca. 43kHz 100mV RMS.
- Tilslut et oscilloskop til den horisontale afbøjningsspole.

Guidelines for fault-finding in the horizontal deflection

- The TV set must not be connected to the mains.
- Connect a tone generator to the horizontal deflection coil via a 1 kohm resistor. The tone generator should produce a sine-wave signal of approx. 43 kHz, 100 mV, RMS.
- Connect an oscilloscope to the horizontal deflection coil.



- Kontroller at resonansfrekvensen er 43 ± 2 kHz ved at ændre tonegeneratorens frekvens.
- Hvis der findes resonansfrekvenser i området 60kHz - 90kHz, kan fejlårsagen være følgende: EHT transformator 4T1 kortsluttet, horisontal afbøjningsspole kortsluttet eller 4C102 afbrudt.

Adskillelse af E/W kredsløbet og horisontal afbøjning

- Ved bredt og forvrænget billede: Afbryd forbindelsen fra 4L8 ben 1 til E/W udgangen (drain på 4TR35 og anoden på 4D77). Hvis billedet herefter bliver smalt og pudeforvrænget, er diode modulatoren ok.
- Ved smalt og forvrænget billede: Afbryd forbindelsen fra 4L8 ben 1 til E/W udgangen, og kortslut ben 1 på 4L8 til stel. Hvis billedet herefter bliver bredt og pudeforvrænget, er diode modulatoren ok.

- Check that the resonant frequency is 43 ± 2 kHz by changing the frequency of the tone generator.
- If resonant frequencies within the 60 kHz - 90 kHz range are found, the reason for this fault may be one of the following: the EHT transformer 4T1 is short-circuited, the horizontal deflection coil is short-circuited or 4C102 is disconnected.

Separation of the E/W circuit and the horizontal deflection

- If the picture is wide and distorted: Disconnect the connection from 4L8 pin 1 to the E/W output (the drain of 4TR35 and the anode of 4D77). If the picture subsequently becomes narrow and has pincushion distortion, the diode modulator is OK.
- If the picture is narrow and distorted: Disconnect the connection from 4L8 pin 1 to the E/W circuit, and short-circuit pin 1 of 4L8 to ground. If the picture subsequently becomes wide and has pincushion distortion, the diode modulator is OK.

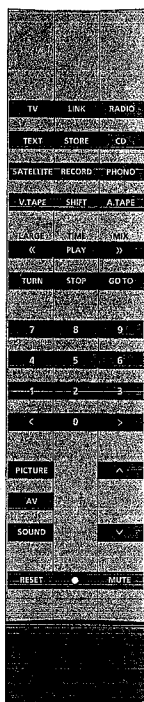
Automatisk Cut-Off

Det automatiske Cut-Off kredsløb udligner automatisk de forskelle, der i løbet af billedrørets levetid opstår mellem de tre elektronkanoners cut-off punkt.

Den automatiske cut-off regulering sker i et samspil mellem 2/12IC4, nogle komponenter i videoudgangen og billedrøret (R, G og B feed-back signalerne).

Hvis en af de tre elektronkanoner kræver højere udstyring, vil DC niveauet i signalet på den tilhørende udgang (ben 1, 3 eller 5) af 2/12IC4 være stigende.

Beolink 1000 MK II



Automatic Cut-Off

The automatic Cut-Off circuit automatically balances out the differences which occur among the cut-off points of the three electron guns during the life of the picture tube.

The automatic cut-off adjustment is achieved through the interaction of 2/12IC4, various components in the video output and the picture tube (the R, G and B feedback signals).

If one of the three electron guns requires higher driving, the DC level of the signal at the ancillary output (pins 1, 3 or 5) of 2/12IC4 will be increasing.

Beolink 1000 MK III



OPTIONS & SHIFT funktioner

OPTIONS

TV'et kan programmeres til flere forskellige options.

Option 0 = TV'ets IR modtager afbrydes.

Option 1 = Video- og audiosystem (Beolinksystem) placeret i samme rum.








Option 2 = Video- og audiosystem (Beolinksystem) placeret i forskellige rum.


Option 5 = Master (TV'et reagerer både på IR data koder og på AUX datalink koder).

Option 6 = Slave (TV'et reagerer kun på IR data koder).

Option 7 = Autokonfiguration. Hvis TV'et står i option 5 og kobles sammen med MCL 2AV, sættes TV'et automatisk i option 7 = option 6, slave. Hvis MCL 2 AV kobles fra TV'et, forbliver TV'et i option 6. Option 1 og 2 har ingen indflydelse på autokonfiguration.




Eksempel på programmering:



Tast    
   = option 1 og 5.



Ved tryk på  blinker stand-by LED'en 1 gang, hvilket betyder at kommandoen er modtaget.

Option 1 og 2 skal altid kædes sammen med option 5 eller 6. TV'et er programmeret til option 1 og 5 fra fabrikken.

SHIFT funktioner

Tast:    = Omskiftning mellem system BG og L.

Tast:   = Non-Interlace.

Tast:   = S-VHS indgangen er nu valgt. Disse SHIFT funktioner er toggle funktioner.

SHIFT 2 funktionen:

Med SHIFT 2 funktionen kan TV'et låses på det valgte program, til optagelse på en videobåndoptager med envejs datakommunikation. Betjeningen er beskrevet på grundlag af Beolink 1000 MK III.

OPTIONS & SHIFT functions

OPTIONS

The TV can be programmed for several different options.

Option 0 = The IR receiver of the TV is disconnected.

Option 1 = Video and audio systems (Beolink system) placed in the same room.







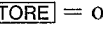
Option 2 = Video and audio systems (Beolink system) placed in different rooms.


Option 5 = Master (the TV responds to both IR data codes and to AUX datalink codes).

Option 6 = Slave (the TV responds to IR data codes only).

Option 7 = Autoconfiguration. If the TV is set to option 5 and connected to an MCL 2AV, the TV is automatically set to option 7 = option 6, slave. If the MCL 2AV is disconnected from the TV, the TV will remain in option 6. Options 1 and 2 have no influence on autoconfiguration.




Programming example:



Press    
   = options 1 and 5.



If  is pressed, the stand-by LED will flash once, indicating that the command has been received.

Options 1 and 2 always have to be linked with option 5 or 6. The TV has been programmed for options 1 and 5 at the factory.

SHIFT functions

Press:    = Switching between system BG and system L.

Press:   = Non-Interlace.

Press:   = The S-VHS input has now been selected.

These SHIFT functions are toggle functions.

The SHIFT 2 function:

By means of the SHIFT 2 function the TV can be locked to the selected programme for recording on a video tape recorder with one-way data communication. The operating procedure has been described on the basis of a Beolink 1000 MK III.

1. En videobåndoptager tilsluttet:

Vælg kilde, **[TV]** eller **[SAT]**, tast nu **[RECORD]**
[RECORD] [SHIFT] [2] TV'et er nu låst på det valgte program.

For at låse signalvejen op igen, tast **[TV]** eller **[SAT] [SHIFT] [2]**.

2. To videobåndoptagere (VTR1 og VTR2) tilsluttet:

Signalvejen kan kun låses til en af videobåndoptagerne af gangen.

VTR1:

Vælg kilde, **[TV]** eller **[SAT]**, tast nu **[RECORD]**
[RECORD] [SHIFT] [2]. TV'et er nu låst på det valgte program til optagelse på VTR1.

For at låse signalvejen op igen, tast **[V.TAPE] [TV]** eller **[SAT] [SHIFT] [2]**.

VTR2:

Vælg kilde, **[TV]** eller **[SAT]**, tast nu **[SHIFT]**
[RECORD] [SHIFT] [RECORD] [SHIFT] [2]. TV'et er nu låst til optagelse på VTR2.

For at låse signalvejen op igen, tast **[SHIFT] [V.TAPE]**
[TV] eller **[SAT] [SHIFT] [2]**.

1. One video tape recorder connected:

Select the source, **[TV]** or **[SAT]**, and then press **[RECORD] [RECORD] [SHIFT] [2]**. The TV is now locked to the selected programme.

To unlock the signal path again, press **[TV]** or **[SAT] [SHIFT] [2]**.

2. Two video tape recorders (VTR1 and VTR2) connected:

The signal path can be locked to only one of the video tape recorders at a time.

VTR1:

Select the source, **[TV]** or **[SAT]**, and then press **[RECORD] [RECORD] [SHIFT] [2]**. The TV is now locked to the selected programme for recording on VTR1.

To unlock the signal path again, press **[V.TAPE]**
[TV] or **[SAT] [SHIFT] [2]**.

VTR2:

Select the source, **[TV]** or **[SAT]**, and then press **[SHIFT] [RECORD] [SHIFT] [RECORD] [SHIFT] [2]**. The TV is now locked to recording on VTR2.

To unlock the signal path again, press **[SHIFT]**
[V.TAPE] [TV] or **[SAT] [SHIFT] [2]**.

ISOLATIONSTEST

Ethvert apparat *skal* isolationstestes efter at det har været adskilt. Testen udføres når apparatet igen er helt samlet og klar til udlevering til kunden.

Isolationstesten udføres på følgende måde:

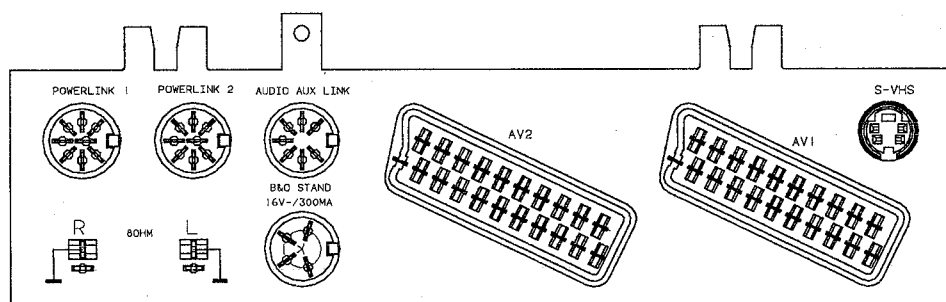
De to stikben på netstikket kortsluttes og tilsluttes en af terminalerne på isolationstesteren. Den anden terminal fra isolationstesteren tilsluttes stelbenet i en af højttalerstikdåserne.

INSULATION TEST

Each set *must* be insulation tested after it has been dismantled. The test is to be carried out when the set has been re-assembled and is ready for delivery to the customer.

The insulation test is carried out in the following way:

Short-circuit the two plug pins of the main plug and connect one of the terminals of the insulation tester. Connect the other terminal of the insulation tester to the chassis pin of one of the loudspeaker sockets.



OBS!

For at undgå beskadigelser på apparatet er det vigtigt, at begge terminaler fra isolationstesteren har virkelig god kontakt.

Der drejes nu langsomt med spændingsreguleringen på isolationstesteren indtil en spænding på 1,5-2 kV er opnået. Her skal den holdes i 1 sekund, derefter drejes der langsomt ned for spændingen igen.

Der må ikke på noget tidspunkt under testen forekomme overslag.

NOTE!

To avoid damaging the set, it is essential that both insulator test terminals are in really good contact.

Now turn slowly the voltage control down on the insulation tester until a voltage of 1.5-2 kV is obtained. Hold it there for 1 sec, then turn slowly the voltage down again.

Flashovers are not permitted during the testing procedure.

KREDSLØBSBESKRIVELSE

Denne kredsløbsbeskrivelse beskriver modul 4, netdel og afbøjning. En del af de resterende kredsløb er stort set identiske med L/LS/LX 4500/5500 og MX 3500/5500, type 39XX.

Det nye Chassis

Det nye TV-chassis omfatter to grundvarianter: en LX/MX-type og en LS-type. Denne serviceanvisning omhandler udelukkende LX/MX-typen. De beskrevne kredsløb er dog identiske i de to varianter.

Kredsløbsgennemgang

Power Supply & Deflection, modul 4, se detailldiagram I samt blokdiagrammer for Power Supply & Deflection.

Switch Mode Power Supply

SMPS'en i 35/42XX er en såkaldt »flyback converter«. Den leverer en række forsyningsspændinger til drift af TV'et og sørger for galvanisk adskillelse mellem lysnettet og TV'ets elektriske kredsløb. Denne adskillelse ligger i T2 og optokoblerne IC1-3.

SMPS'en er pulsbreddemoduleret og kører under normal drift på en fast frekvens af ca. 32 kHz, som er låst til liniefrekvensen, for at undgå forstyrrelser i billedet.

SMPS'en leverer forsyningsspændinger under alle driftsforhold, således også i St.By. Her er driftsfrekvensen dog ca. 20 kHz, for at der kan trækkes lidt ekstra strøm fra skiftesystemet.

Alle styrekredsløb (oscillator, modulator, driver m.v.) er placeret på primærsiden, så SMPS'en selv kan starte op i St.by. Dermed undgås en separat St.by-forsyning, f.eks. med en 50 Hz transformator.

Opbygning

På primærsiden finder man styrings-/reguleringskredsløbet.

Oscillatoren består af TR4-5 samt den frekvensbestemmende komponent, C24 (C18).

Rampegeneratoren D16, C26 og R24.

Pulsbreddemodulatoren TR6-8 samt Driverkredsløbet TR9-12.

TR2, L1 og R4 er målekredsløb for overlastsikring. Primærvikling 1-4 samt dioderne 9-12 giver en ca. $\pm 5V$ forsyning til primærkredsløb, driver og optokoblere.

TR13 er reguleringstransistor for pulsbreddemodulatoren fra tilbagemeldingskredsløbet.

Snubberkredsløbet D5-7, L7 og C7-12 (-C9) begrænser spændingsspidser over TR1, når denne slukker.

CIRCUIT DESCRIPTION

This circuit description describes module 4, the power-supply unit and the deflection circuit. A number of the remaining circuits are largely identical with those in L/LS/LX 4500/5500 and MX 3500/5500, type 39XX.

The new chassis

The new TV chassis comprises two basic models: an LX/MX model and an LS model. These service instructions deal with the LX/MX model exclusively. However, the circuits described below are identical in the two models.

Circuit examination

Power Supply & Deflection, module 4, see detailed diagram I and the block diagrams for Power Supply & Deflection.

Switch Mode Power Supply

The SMPS in the 35/42XX is a so-called flyback converter. It outputs a number of supply voltages for the operation of the TV, and it ensures galvanic separation between the mains and the electrical circuits of the TV. This separation lies in T2 and the optocouplers IC1-3.

The SMPS is pulse-width modulated, and in ordinary operation it runs with a fixed frequency of approx. 32 kHz which is locked to the line frequency in order to avoid noise in the picture.

The SMPS outputs supply voltages under all operating conditions, also in stand-by. However, in stand-by the operating frequency is only approx. 20 kHz in order to permit a little extra current to be drawn from the switching system.

All control circuits (oscillator, modulator, driver, etc.) are placed on the primary side such that the SMPS is able to start up by itself in stand-by. A separate stand-by supply, e.g. as provided by a 50 Hz transformer, is thus not required.

Construction

The control/regulating circuit is located on the primary side. The oscillator consists of TR4-5 and the frequency determining component, C24 (C18). The ramp generator D16, C26 and R24. The pulse-width modulator, TR6-8, and the driver circuit, TR9-12.

TR2, L1 and R4 constitute the measuring circuit for the overload protection system. Primary winding 1-4 and the diodes 9-12 provide approx. $\pm 5V$ supply for the primary circuit, driver and optocouplers. TR13 is a regulating transistor for the pulse-width modulator from the feedback circuit. The snubber circuit, D5-7, L7 and C7-12 (excluding C9), limits the voltage peaks across TR1, when this switches off.

Kontrol- og tilbagemeldingskredsløbet på sekundærsiden består af TR16-17 og dioderne D40-42 + D52. Kredsløbet omkring TR18-20 fungerer som »on-off« switch styret af power failure pulser.

TR15 er St.by afbryder for forsyningsspænding til tuner og Beosat LM.

Optokobler IC1 overfører tilbagemeldingsinformation fra sekundært til primært kredsløb.

Optokobler IC2 overfører horisontal synkronisering til oscillatoren.

Optokobler IC3 overfører netfrekvensinformation (50 Hz) til mikroprocessorkredsløbet for synkronisering af TV'ets interne ur.

Princip

Pulser fra oscillatoren tilføres rampegeneratoren. Denne opbygger en rampepuls på toppen af C26, pulsbreddemodulatoren.

Skifteniveauet (»Threshold value«) for pulsbredde-modulatoren er bestemt af spændingen fra feedback-regulatoren (TR13). Ved et bestemt niveau trækker modulatoren i TR8, samtidig aflades C26 af oscillatoren gennem D16.

Herefter startes forfra.

Derved opstår der pulser på kollektoren af TR8.

Disse forstærkes i driver-trinnet, som er koblet som en push-pull forstærker.

De forstærkede pulser sørger herefter for at trække skiftetransistoren, TR1 (BUT12), on og off.

Når TR1 leder, løber der en strøm fra 300V DC gennem primærviklingen (5-7) og TR1 til stel.

Derved oplades der energi i transformatoren. Når TR1 trækkes off, bliver den opladede energi i T2 overført til lytterne på sekundærsiden.

L2, R54 og C39 er et støjkompenseringsled, som udkompenserer den støjstrøm, der overspilles inde i transformatoren mellem dennes kapaciteter. Y-kondensatorerne C5-6 indgår i denne støjkompen-
sering.

R10 (10 Mohm) forhindrer evt. statisk opladning af TV'et til jord.

C5, C6 og R10 er sikkerhedskomponenter, som er placeret i henhold til myndighedskrav.

The monitoring and feedback circuit on the secondary side consists of TR16-17 and the diodes D40-42 + D52.

The circuit around TR18-20 operates as an on-off switch that is controlled by power failure pulses. TR15 is the stand-by switch for the supply voltage to the tuner and Beosat LM.

Optocoupler IC1 transfers feedback information from the secondary to the primary circuit.

Optocoupler IC2 transfers horizontal synchronization to the oscillator.

Optocoupler IC3 transfers mains frequency information (50 Hz) to the microprocessor circuit for the synchronization of the internal clock of the TV.

Principle

Pulses from the oscillator are applied to the ramp generator. This generator builds up a ramp pulse at the top of C26, the pulse-width modulator. The threshold value for the pulse-width modulator is determined by the voltage from the feedback regulator (TR13). At a certain value, the modulator switches TR8 on and simultaneously C26 is discharged by the oscillator through D16. This cycle is then repeated.

Consequently, pulses occur at the collector of TR8. These pulses are amplified in the driver stage, which is coupled as a push-pull amplifier.

The amplified pulses then make the switching transistor, TR1 (BUT12), go on and off.

When TR1 is conducting, a current from the 300V DC supply runs through the primary winding (5-7) and TR1 to ground. The transformer is thus charged with energy. When TR1 is pulled off, the energy charged in T2 is transferred to the lyts on the secondary side.

L2, R54 and C39 constitute a noise compensation circuit that obviates the noise current transferred between the capacitances inside the transformer. The Y-capacitors, C5-6, are incorporated in this noise compensation system.

R10 (10 Mohm) prevents any static charging of the TV compared to ground.

C5, C6 and R10 are safety components which have been chosen in compliance with the requirements of the official authorities.

Beskyttelse

SMPS-oscillatoren synkroniseres i video mode af horisontale flybackpulser, som overføres af optokobleren IC2. De tilføres oscillatoren på basis af TR5 gennem D18. Derved resettes oscillatoren på hveranden puls, så den kører nøjagtig dobbelt liniefrekvens (31,25 kHz).

D18 sikrer, at støj ikke indstråles direkte i oscillatoren.

Oscillatoren forsynes fra 300V DC, men frekvensen er meget stabil overfor spændingsvariationer.

Push-pull drivertrinnet forsynes med $\pm 5V$ for at sikre en effektiv styring af skiftetransistoren, TR1. R36, R38, C30 og D17 trækker en kontrolleret negativ basisstrøm ud af BUT12, når denne afbrydes, således at dette sker hurtigst muligt.

Det såkaldte snubber-kredsløb sidder parallelt med primærvikling 5-7 i kollektoren af TR1. Kredsløbet begrænser de kraftige spændingsspidser, der genereres over primærviklingen, når skiftetransistoren slukkes, for at den ikke skal blive ødelagt.

C12 overfører spidserne, som via D5-7 enten lægges til stel eller tilbage på forsyningen afhængig af polaritet.

Stelpunktet for den brokoblede ensretter D1-4 ligger på toppen af L1 og R4. Ved at måle spændingsfaldet over disse to komponenter fås således et udtryk for strømmen i primærviklingen af T2.

TR2 måler via R7 dette spændingsfald. Ved for kraftig primærstrøm trækkes emitteren lav, TR2 begynder at lede, og der trækkes i feedback-regulatoren. Derved begrænses bredden af styrepulserne, og belastningen falder.

Denne overbelastningsbeskyttelse skal forhindre strømmene i at løbe løbsk ved opstart samt ved evt. kortslutning af en af udgangene, igen for at beskytte BUT12 (TR1).

Opstart

Når TV'et tilsluttes netspænding, skal SMPS'en selv starte op og levere 8V St.By spænding.

De fleste kredsløb på primærsiden er forsynet af 300V DC, som straks er til stede.

Samtidig ledes netspænding via R45 og IC3/R44 til C32. Herfra lades der på C29 (100 μ F) via R43.

Endvidere bliver den 50 Hz brum, der ligger over C32 (1 μ F), ført via R29 til feedback-regulatoren. Det bevirker, at opstartsforsøg kommer i små klumper af 50 Hz.

Dermed lettes opstarten til St.By, så den er mulig allerede ved en netspænding på ca. 120V.

Protection

The SMPS oscillator is synchronized in video mode by horizontal flyback pulses which are transferred by the optocoupler, IC2. These pulses are applied to the oscillator at the base of TR5 through D18.

Consequently, the oscillator is reset with every second pulse such that it runs at exactly twice the line frequency (31.25 kHz).

D18 prevents direct noise pick-up by the oscillator. The oscillator receives its power from the 300V DC power supply.

However, the frequency is very stable towards voltage fluctuations.

The push-pull driver stage receives a $\pm 5V$ power supply in order to ensure efficient control of the switching transistor, TR1. R36, R38, C30 and D17 draw a controlled negative base current from BUT 12 when the latter is disconnected such that it takes place as quickly as possible.

The so-called snubber circuit is parallel to the primary winding 5-7 in the collector of TR1. This circuit limits the strong voltage peaks generated across the primary winding when the switching transistor is switched off, thereby preventing the transistor from being destroyed. C12 transfers the peaks, and via D5-7 they are either connected to ground or fed back to the supply, depending on the polarity.

The ground level of the bridge-coupled rectifier, D1-4, is at the top of L1 and R4. A measurement of the voltage drop across these two components thus gives an expression of the current in the primary winding of T2. TR2 measures this voltage drop via R7. If the primary current is excessive, the emitter is pulled low, TR2 starts conducting, and the feedback regulator is activated. This limits the width of the control pulses, and the load drops.

This overload protection serves to prevent the currents from running wild at power-up and in the event of a short-circuit in one of the outputs, still in order to protect BUT12 (TR1).

Power-up

When the TV is connected to the mains voltage, the SMPS has to start up by itself and supply 8V stand-by voltage.

Most circuits on the primary side receive the 300V DC supply which is available immediately.

Mains voltage is applied at the same time to C32 via R45 and IC3/R44. C32 charges C29 (100 μ F) via R43. Furthermore, the 50 Hz hum across C32 (1 μ F) is fed through R29 to the feedback regulator. This has the effect that power-up attempts come in small lumps of 50 Hz each.

This facilitates the power-up procedure to stand-by such that it is enabled even at a mains voltage of approx. 120V.

Stand By drift

Under St.by er power failure bussen 0V (ingen pulser).

Dermed er »on-off« kredsløbet TR18-19 ikke aktiveret, og TR20 leder.

Spændingsspidser fra sekundærvikling 11-13 ledes via R58 og C50 til D37, som clamber de negative spidser til St.by forsyningen.

Ved midling i R76 skaber de positive spændingsspidser således en gate-forspænding før R78 på ca. 19V.

D50 sikrer, at spændingen ikke stiger og dermed skader FET'en.

Når TR20 leder, er sekundærvikling 20 før D31 lagt til St.by forsyningen (Drain-Source). Derved er det hovedviklingen fra T2, som genererer 8V forsyningsspænding.

Tilbage melding og stabilisering sker ved, at St.by forsyningen ledes via R79, D52 og D41 til IC1 – feedback-optokobler.

Derved tvinges pulsbreddemodulatoren til at lave så små pulser, at SMPS'en kun leverer ca. 8V på hovedviklingen.

I audio/video mode leverer primærvikling 4 på T2 positiv basisspænding via D15 til TR3, hvorved denne er spærret.

I St.by er spændingen fra vikling 4 for lav, og -5V får gennem R11 TR3 til at lede. Derved parallelkobles C18 med C24, således at oscillatorfrekvensen falder fra 32kHz til ca. 20kHz.

Den lavere frekvens giver mulighed for at trække en lidt højere St.by strøm (ca. 0,4 A).

Gennem TR15 (emitter-kollektor) leveres i A/V-mode 154V til tuningsspænding og til Beosat LM. I St.by falder spændingen på emitteren til ca. 8V identisk med basis. Herved spærres TR15 for forsyningen til de omtalte kredsløb i St.by.

Video mode drift

Ved opstart til video mode leverer mikroprocessoren power failure pulser.

Disse pulser ledes via C62 og R84 til basis af TR19, som således skifter on/off med samme frekvens som power failure pulserne. Herved startes en opladning af C61. Efter kort tid overstiger spændingen på TR18 basis ca. 0,7V, og denne går on og trækker dermed TR20 gate lav. TR20 går off, og St.by spændingen bliver afbrudt.

Nu begynder St.by spændingen at falde, og det registreres naturligvis gennem feedback-kredsløbet. TR13 kollektor stiger, hvorved pulsbreddemodulatoren genererer bredere pulser.

Det bevirker, at udgangsspændingerne fra sekundærsiden af T2 begynder at stige. Da TR20 er afbrudt fortsætter denne stigning indtil alle driftsspændinger er på plads.

D.v.s. 154V fra hovedviklingen og 8V fra St.by viklingen m.v. St.by viklingen (13) overtager nu selv St.by forsyningen gennem D35.

Stand-by operation

During stand-by, the power failure bus has 0V (no pulses). Consequently, the on-off circuit, TR18-19, is not activated, and TR20 is conducting.

Voltage peaks from secondary winding 11-13 are fed through R58 and C50 to D37 which clamps the negative peaks to the stand-by supply. Through averaging in R76, the positive voltage peaks thus generate a gate bias before R78 of approx. 19V. D50 ensures that the voltage does not increase, thereby damaging the FET. When TR20 is conducting, secondary winding 20 before D31 is connected to the stand-by supply (Drain-Source). Consequently, it is the main winding from T2 that generates the 8V supply voltage.

Feedback and stabilization is achieved by feeding the stand-by supply through R79, D52 and D41 to IC1, the feedback optocoupler. This forces the pulse-width modulator to generate pulses which are so narrow that the SMPS supplies only approx. 8V to the main winding.

In audio/video mode, primary winding 4 on T2 supplies positive base voltage through D15 to TR3, causing the latter to be blocked.

In stand-by, the voltage from winding 4 is too low, and through R11 the -5V supply makes TR3 conduct. C18 and C24 are thereby connected in parallel such that the oscillator frequency drops from 32 kHz to approx. 20 kHz. The lower frequency permits a slightly higher stand-by current to be drawn (approx. 0.4 A).

154V is supplied through TR15 (emitter-collector) as tuning voltage and to Beosat LM in A/V mode. In stand-by, the voltage at the emitter drops to approx. 8V, which is identical with the base voltage. This makes TR15 block the supply to the above-mentioned circuits in stand-by.

Video mode operation

If the TV is set to go into video mode at power-up, the microprocessor will generate power failure pulses. These pulses are fed through C62 and R84 to the base of TR19, which will thus switch on/off at a frequency identical with that of the power failure pulses. This initiates the charging of C61.

After a short period of time, the voltage at the base of TR18 exceeds approx. 0.7V, causing it to go on and thereby pulling the TR20 gate low. TR20 goes off, and the stand-by voltage is disconnected.

The stand-by voltage now begins to drop, and this is monitored through the feedback circuit, of course. The collector of TR13 increases, causing the pulse-width modulator to generate wider pulses. Consequently, the output voltages from the secondary side of T2 begin to increase. Since TR20 is disconnected, this increase will continue until all operating voltages have been adjusted to their proper values, i.e. 154V from the main winding and 8V from the stand-by winding, etc. The stand-by winding (13) now takes over the stand-by supply through D35 itself.

In video mode er 154V den stabiliserende spænding. Spændingsdeleren R70-72 følger på 154V og leverer basisstrøm til TR17.

TR16-17 udgør sammen en strømgenerator, som styrer strømmen i optokobleren IC1. Reference for styrespændingen fra 154V er D42, 6,2V zenerdiode. Forsyningsspænding til strømgeneratoren er delvis genereret af 15V og delvis 13VTV, som leveres fra T1, horisontal transformator via D40.

Audio mode drift

I audio mode fungerer SMPS'en på samme måde som i video mode, dog benyttes 15V som den stabiliserende spænding, da 154V stort set er ubelastet.

I audio mode er afbøjningskredsløbet slukket, derfor mangler 13VTV. I stedet benyttes alene 15V som forsyningsspænding til strømgeneratoren, TR16-17. Spændingsdeleren R64 og R68 bevirker dog at forsyningsspændingen falder fra 8,3V til 7V. Samtidig stiger »154V« forsyningen i audio mode til mellem 170-200V, p.g.a. manglende belastning. Da basisforspændingen til TR17 stiger, går denne i mætning og kollektorspændingen bliver lig med zenerspændingen fra D42, 6,2V.

Dermed bliver TR16 reguleringstransistor og reagerer udelukkende på spændingsvariationer på emitteren, dvs. fra 15V forsyningen.

TV Off

Når TV'et slukkes, fjernes power failure pulserne af mikroprocessoren. Dette kan naturligvis også forårsages af en fejl, som belaster power failure bussen, deraf formålet med denne (se Power Failure diagram).

Når pulserne forsvinder, går TR19 off, og C61 aflades gennem R81, R82 og R85, hvorved TR18 ligeledes går off. Nu stiger gatespændingen på TR20, som derved går on. Det bevirker, at hovedforsyningsviklingen bliver lagt på 8V St.by kondensatoren, C52 (2200µF). Transformatorspændingen falder således øjeblikkeligt til 8V, og tilbagemeldingen gennem D52 og D41 sikrer, at spændingen forbliver 8V, indtil TR20 igen går off. Spændingen på C42 falder ligeledes i løbet af nogle få sekunder fra 154V til ca. 8V.

Degauss

Afmagnetiseringsspolen og PTC'en (R2) sidder i serie med triac'en (ST1) direkte til netspændingen. Når TV'et tændes, resulterer energiforøgelsen i T2 i en spænding fra primærvikling 9-10. Denne spænding ledes via R6, ensrettes af D8 og oplades på C14, hvorefter ST1 går on. Således afmagnetiseres billedrøret, hver gang TV'et tændes.

In video mode, 154V is the stabilizing voltage.

The voltage divider, R70-72, scans the 154V and supplies base current to TR17.

TR16 and TR17 collectively constitute a current generator that controls the current in the optocoupler, IC1. The reference for the control voltage from the 154V supply is D42, a 6.2V Zener diode. The supply voltage to the current generator is generated partly by 15V and partly 13VTV which is supplied by T1, a high voltage transformer via D40.

Audio mode operation

The SMPS operates in the same way in audio mode as it does in video mode, only 15V is used as the stabilizing voltage, because 154V is largely unloaded.

The deflection circuit is switched off in audio mode, and 13VTV is consequently missing. 15V is used only as the supply voltage to the current generator, TR16-17.

However, the voltage divider, R64 and R68, has the effect that the supply voltage drops from 8.3V to 7V. The 154V supply increases to 170-200V in audio mode at the same time, because of the missing load.

Since the base bias applied to TR17 increases, TR17 goes into saturation and the collector voltage becomes equal to the Zener voltage from D42, i.e. 6.2V.

Consequently, TR16 becomes a regulating transistor, and it reacts to voltage variations at the emitter exclusively, i.e. from the 15V supply.

TV off

When the TV is switched off, the power failure pulses are removed by the microprocessor. Of course, this may also be caused by an error that loads the power failure bus, hence the objective of having it installed (see the Power Failure diagram).

When the pulses disappear, TR19 goes off and C61 is discharged through R81, R82 and R85, causing TR18 to go off as well. The gate voltage at TR20 will now increase, and it will go on. This has the effect that the main supply winding is connected to the 8V stand-by capacitor, C52 (2200µF). The transformer voltage will thus drop to 8V immediately, and the feedback through D52 and D41 ensures that the voltage remains at 8V until TR20 goes off again. The voltage across C42 also drops from 154V to approx. 8V within a few seconds.

Degauss

The degaussing coil and the PTC (R2) are connected in series with the triac (ST1), receiving a direct mains voltage supply. When the TV is switched on, the increase in energy in T2 results in a voltage from primary winding 9-10. This voltage is fed through R6, rectified by D8 and charged at C14, causing ST1 to go on. Thus the picture tube is then degaussed every time the TV is switched on.

Deflection

Modul 13, Sync. Processing, genererer alle nødvendige afbøjningssignaler som ledes til forstærkerkredsløbene på modul 4 (Power Supply & Deflection).

Afbøjningsudgangene kan deles op i tre:

- Horizontal Drive
- Vertical Drive
- East/West Drive

Horizontal Udgang

Horisontalkredsløbet sørger for horisontal afbøjning. Endvidere genererer horisontaltransformatoren en række spændinger:

- Højspænding 27,5kV
- Fokusspænding
- Glødespænding 6,3V
- 13VTV
- 7VTV
- $\pm 11V$ til vertikal udgang, IC4

og desuden

- Horisontale flyback-pulser
- Strålestrømsinformation

Horizontal Drive består af en drivertransistor og en drivertransformator TR31 og T4, samt udgangstransistoren TR33.

Kredsløbet forsynes fra 154V gennem horisontaltransformatorens primærvikling, ben 2/10, hvorved energi genereres i horisontal transformatoren, når afbøjningen kører.

Horisontaltransformatoren er konstrueret, så den afgiver meget præcise spændinger.

Derved har det kunnet undgås at montere en seriemodstand for glødespændingen. Det betyder, at forskellige typer billedrør kan benyttes, uden at en sådan modstand skal ændres. Desuden tabes mindre energi i form af varme.

Endvidere findes der ingen sikringsmodstande på forsyningerne +7VTV og +13VTV.

I stedet er der monteret et beskyttelseskredsløb, i form af IC5.

Strømmen i horisontalkredsløbet går til stel gennem R127 (0,22 ohm). Spændingen på toppen af R127 føles gennem R125, og ledes til -indgangen af operationsforstærkeren IC5, ben 2.

+indgangen, ben 3, ligger på en fast referencespænding i form af spændingsdeleren R122/R123 (1% modstande).

Hvis strømmen gennem R127 overstiger et vist niveau (f.eks. ved en kortslutning af en transformatorudgang), så overstiger spændingen på -indgangen af IC5 +indgangen.

Deflection circuit

Module 13, Sync Processing, generates all the necessary deflection signals which are fed to the amplifier circuits on module 4 (Power Supply & Deflection).

The deflection outputs may be divided into three circuits:

- Horizontal Drive
- Vertical Drive
- East/West Drive

Horizontal drive

The horizontal circuit provides horizontal deflection. Furthermore, the horizontal transformer generates a number of voltages:

- High voltage, 27.5kV
- Focusing voltage
- Filament voltage 6.3V
- 13VTV
- 7VTV
- $\pm 11V$ to vertical output, IC4

as well as

- Horizontal flyback pulses
- Beam current information

Horizontal Drive consists of a driver transistor and a driver transformer, TR31 and T4, as well as the output transistor, TR33.

The circuit is supplied by the 154V power supply through the primary winding of the horizontal transformer, pin 2/10, and energy is thus generated in the horizontal transformer when the deflection circuit is in operation.

The horizontal transformer has been designed to output very accurate voltages.

Installation of a series resistor for the filament voltage has thus not been necessary. This means that different types of picture tube may be used without changing the specifications of such a resistor. Besides, less energy is lost in the form of heat.

Furthermore, the +7VTV and +13VTV power supplies do not have any fuse resistors.

A protective circuit in the form of IC5 has been installed instead.

The current in the horizontal circuit runs to ground through R127 (0.22 ohm). The voltage at the top of R127 is monitored through R125 and fed to the negative input of the operational amplifier, IC5, pin 2. The positive input, pin 3, has a fixed reference voltage in the form of the voltage divider, R122/R123 (1% resistors).

If the current through R127 exceeds a certain level (e.g. in the event of a transformer output short-circuit), the voltage at the negative input of IC5 will exceed that at its positive input.

Differencen betyder at operationsforstærkeren trækker i Power Failure bussen via R126 og D75. Derved går TV'et i St.By. C73 sørger for, at kun middelforbruget fra transformatoren registreres.

For at sikkerhedskredsløbet ikke skal reagere på et kraftigt strålestrømsforbrug fra transformatoren, er D78 og R124 indført.

Disse følger på strålestrømmen gennem bunden af højspændingsviklingen, ben 4.

Ved stigende strålestrøm falder spændingen på D78, og derved trækkes negativt i spændingen til sikkerhedskredsløbet, som derved udkompenseres for ændringer i strålestrømmen.

1 Gohms modstand internt i horisontaltransformatoren aflader billedrøret når TV'et slukkes. Afladningen sker gennem fokuspotentiometeret til stel. Herved undgås en lysende prik på skærmen, når TV'et slukkes.

Svingningskredsen, L8/C81, har til opgave at »flytte« en parasitresonans inde i transformatoren, for at opnå en bedre og mere flad højspændingskarakteristik.

Vertikal Udgang

Vertical drive består af IC4, som forstærker savtandspulserne fra Sync. Processing og trækker vertikal afbøjning.

IC4 forsynes af $\pm 11V$ fra horisontaltransformatoren. Endvidere leverer IC4 vertikale flyback-pulser fra ben 3 til bl.a. vertikal sikkerhedskredsløb i sync. processoren (IC1) på modul 13.

Det sker for at undgå ødelæggelse af billedrøret ved fejl i vertikal afbøjning (vandret streg).

Øst/Vest Udgang

E/W drive kredsløbet er i teorien opbygget som en SMPS.

I dette tilfælde dog en SMPS der ikke afgiver effekt men derimod optager effekt fra diodemodulatoren. Denne effekt (ca. 1,5W) ledes via D77 tilbage til forsyningen, 154V.

På udgangen af kredsløbet (TR35, Drain) ses ikke et parabelformet signal, men et firkantsignal (0V - 150V).

Da signalet passerer en spole (L8) inden diodemodulatoren, bliver kun middelværdien videreført, nemlig svarende til en parabel.

C90 har to opgaver:

- at lave firkantpulser fra udgangen om til en parabel i tilbagetilkoblingen
- at være bestemmende for sløjfeforstærkningen i kredsløbet.

The difference makes the operational amplifier pull the Power Failure bus low via R126 and D75. As a consequence, the TV goes into stand-by. C73 ensures that only the mean consumption from the transformer is registered.

D78 and R124 have been installed to prevent the protective circuit from reacting to a heavy beam current consumption from the transformer. These two components monitor the beam current through the base of the high-voltage winding, pin 4.

When the beam current increases, the voltage at D78 drops. This makes the voltage to the protective circuit go in negative direction, thereby obviating changes in the beam current.

A 1 Gohm resistor internally in the horizontal transformer discharges the picture tube when the TV is switched off. This discharge is effected through the focusing potentiometer to ground. In this way a light dot on the screen is avoided when the TV is switched off.

The task of the oscillatory circuit, L8/C81, is to "move" a parasitic resonance inside the transformer in order to achieve a better and flatter high-voltage characteristic.

Vertical Drive

The vertical drive consists of IC4 which amplifies the sawtooth pulses from Sync. Processing and drives the vertical deflection.

IC4 is supplied by the $\pm 11V$ power supply from the horizontal transformer. Furthermore, IC4 outputs vertical flyback pulses at pin 3 a.o. to the vertical protective circuit in the sync. processor (IC1) on module 13. This is done in order to avoid that the picture tube is destroyed by errors in the vertical deflection (horizontal line).

East/West Drive

In theory, the E/W drive circuit is designed like an SMPS. In this case, however, an SMPS that does not supply power but rather draws power from the diode modulator.

This power (approx. 1.5W) is fed back to the 154V power supply via D77.

The output of the circuit (TR35, Drain) is not a parabolic signal but rather a square-wave signal (0V - 150V).

Since the signal passes a coil (L8) before the diode modulator, only the mean value is propagated, and this signal corresponds to a parabola.

C90 serves a dual objective:

- converting square-wave pulses from the output into a parabola in the feedback
- determining the loop amplification in the circuit.

Operationsforstærkeren (IC5) tilføres et parabelformet drive-signal på +indgangen, ben 5. Modkobling fra udgangen af kredsløbet via R112 ledes til -indgangen, ben 6.

Der står nu et parabellignende signal på udgangen af operationsforstærkeren, IC5 ben 7. Det ser en anelse forvrænget ud, da det samtidig indeholder en lille savtand på ca. 1Vss. Denne savtand påstår ved integration af udgangssignalet i RC-leddet R112/C90.

Spændingen på IC5, ben 7, fungerer nu som en »DC«, der bestemmer, hvor brede pulser kredsløbet skal levere.

Jo højere spænding på ben 7 des bredere pulser fra TR35.

De bredeste pulser, der kan leveres, er dog af samme bredde som horisontale flyback-pulser.

Positive flyback-pulser fra horisontaltransformeren, vikling 1 (glødespænding), ledes via R117 til knudepunktet mellem R116 og D76.

Der opstår således en flyback-puls med variabelt DC-indhold på katoden af D76. DC-indholdet varieres fra operationsforstærkeren, IC5.

Den positive del af flyback-pulsen afbryder D76. Så oplades C91 via R119 fra 13VTV. Det betyder, at der kommer til at stå en rampespænding på C91. Denne rampe tænder og slukker TR34.

Spændingen fra IC5, ben 7 bestemmer rampens højde og dermed ledetiden for TR34.

Derved opstår der firkantpulser på udgangen af FET-transistoren, TR35, med varierende bredde.

Systemet er samtidig linielåst p.g.a. styringen med horisontale flyback-pulser fra glødeviklingen.

Ved at ændre på parabelsignalet til IC5, ben 5, kan Ø/V-korrektionen bestemmes.

A parabolic drive signal is applied to the positive input, pin 5, of the operational amplifier (IC5). Negative feedback from the output of the circuit is fed to the negative input, pin 6, via R112.

The signal at the operational amplifier output, IC5, pin 7, now has a shape similar to a parabola. It appears to be slightly distorted, because it also contains a small sawtooth of approx. 1Vss. This sawtooth remains when the output signal is integrated in the RC section, R112/C90.

The voltage at IC5, pin 7, is now operating as a "DC" that determines the width of the pulses supplied by the circuit.

The higher the voltage at pin 7, the wider the pulses from TR35. However, the widest pulses that may be generated are of the same width as horizontal flyback pulses.

Positive flyback pulses from the horizontal transformer, winding 1 (filament voltage), are fed through R117 to the junction between R116 and D76.

Consequently, a flyback pulse with a variable DC content occurs at the cathode of D76. The DC content is varied by the operational amplifier, IC5.

The positive portion of the flyback pulse disconnects D76. C91 is then charged by 13VTV via R119. This means that there will be a ramp voltage at C91. This ramp switches TR34 on and off.

The voltage from IC5, pin 7, determines the height of the ramp and thus the "On" period of TR34. Consequently, square-wave pulses of varying width occur at the output of the FET transistor, TR35.

At the same time, the system is line locked because of the control exercised by the horizontal flyback pulses from the filament.

The E/W correction may be determined by changing the parabolic signal applied to IC5, pin 5.